

MILLTOWN HILL PROJECT
POTENTIAL ARABLE LANDS
AND WETLANDS
FIGURE 3-11-3

- Ⓐ - "MANIPULATED PASTURE" WETLANDS
- Ⓑ - "NATURAL CONDITIONS" WETLANDS

"Natural Condition" wetlands exemplify a classical type of wetlands. Hydrophytic vegetation is highly diverse in size and species type, the water regime is often shallowly ponded; diversity of wildlife species and habitat is apparent. These wetlands are often flood plains found next to streams.

"Manipulated Pasture" wetlands exemplify emergent aquatic vegetation with low diversity, sporadic distribution, less apparent hydrology, and have little or no wildlife species or habitat value. They are located in pasturelands where the ground has often been leveled, having lowered water tables, unable to support a total cover of wetland plant species. Most of the areas identified (60%) are manipulated pasture wetlands.

3.1.11.2 Impacts to Vegetation

3.1.11.2.1 Construction

The reservoir would inundate 681 acres within the interior valley, mixed-evergreen, and mixed-conifer vegetation zones at a pool elevation of 775 feet msl. The Habitat Evaluation Procedure (HEP) determined the wildlife cover types that would be lost are about 173 acres of riparian, 260 acres grass/pasture, 238 acres of shrub/timber, and 9 acres of stream/open water. About 681 acres of aquatic habitat would be created in the reservoir. On the remaining 100 acres in the takeline area, an additional 50 acres would be lost or disturbed by development of the Otten Quarry, construction of recreation areas, and road relocations. This includes about 15 acres of grass/pasture, 30 acres of shrub/timber, and 5 acres of riparian.

Field investigations estimated that out of a total 203 acres of wetlands, about 28 acres of wetlands are located in the agricultural areas that could be served with project water. Approximately 31 acres of wetlands vegetation would be lost due to reservoir inundation. About 60% of the wetlands are manipulated pasture wetlands.

The installation of the pipeline system would require excavation in existing road rights-of-way. Loss of vegetation would be minimal because these areas are either cleaned or sprayed periodically to maintain water drainage. Pipeline stream crossings (See: Section 3.1.9, Water Quality) would be trenched near the bridge crossings. Minimal disturbance of vegetation is anticipated.

The placement of subsurface drainage pipe would temporarily disrupt the vegetative cover on up to 15.6 acres of existing pasture land. The trench would be filled and then seeded with

suitable grass species.

3.1.11.2.2 Operation

Project operation generally would not affect vegetation in the reservoir pool. The annual drawdown could cause a dewatering of small slough areas along the margins of the reservoir which could cause a loss of a small amount of riparian vegetation seasonally and a drying-up of wetland areas. Operation of the improved irrigation systems, with new subsurface drainage systems would produce increased crop vigor and yield, and also allow crop diversification.

3.1.11.3 Mitigation of Impacts to Vegetation

Those areas temporarily disturbed by construction activities would be recontoured and revegetated after construction to hasten rehabilitation. Native vegetation would be used to the extent possible. The loss of 173 acres of riparian vegetation by reservoir inundation would be mitigated by habitat enhancement on portions of Elk Creek downstream of the dam site. Enhancement would include plantings and/or fencing in areas where vegetation has been affected by grazing, brush clearing, and other human activities. The loss of wetlands in the reservoir area (approximately 31 acres), would be mitigated by development of wetlands in the upper end of the reservoir. This would be done by planting shallow marsh plants such as horsetails, cottails, spikerush, bur-reed, skunk cabbage, toad rush, tufted hair grass, and manna grass. There would be no significant loss of wetland values in the project area. The values of created wetlands at the upper end of the reservoir would be higher than the existing values of "manipulated pasture" wetlands that occur in the reservoir site. (See: Section 3.1.14, Wildlife Resources).

Wetlands would not be lost in the service area. The wetlands that have been identified would be protected from farming operations by the County. This would be enforced by informing the land-owners of the areas to be protected as the water is subscribed. No project drainage or change in agricultural practices would occur to negatively affect jurisdictional wetlands at the time the water service contract is negotiated. This would be enforced by County with a wetland protective clause in the water service contract between the County and individual water user.

Impacts that result from pipeline stream crossings would be mitigated by construction during low or no flow months. Bank material would be removed and replaced, the area re-seeded, and erosion protection applied.

The purchase of a 3-acre log pond that was discussed in the

DEIS for the project would not be part of the project as planned. A decision to remove the log pond from the project was made after further investigation by Douglas County determined that water quality in the log pond was not as anticipated, based on prior conversations, and that a considerable clean-up liability may be incurred if the pond was part of the project. This decision to remove the log pond from the project does not deter Douglas County's desire to use the log pond for development of a recreational and wildlife facility, but it is in Douglas County's best interest to pursue it separately from the Milltown Hill Project. Also, there may be additional funding sources available (for clean-up) if the log pond is not part of the project.

3.1.12 Agriculture

3.1.12.1 Existing Agricultural Conditions

Douglas County farms can be characterized as livestock farms and ranches, with a few general crop, orchard, and vegetable farms. A fulltime farm unit generally includes some non-irrigated pasture as well as irrigated pasture and hay to support a livestock operation. This is reflected in the fact that about 80 percent of total sales of agricultural products in Douglas County in 1987 was from livestock sales. Although some small grains are grown, they are generally a minor enterprise on farms in the subbasin (Myers, 1992).

The agricultural lands in the reservoir pool area and downstream of the dam are pasture areas for sheep and other livestock or hay crops that are typically located in the bottoms along the stream course. Land within the project that is suitable for irrigation is used almost exclusively as grass pasture, hay, or combination pasture-hay. A very minor acreage is in wine vineyards, orchards or Christmas tree farms. A significant acreage of the alluvial lands have been improved by clearing of timber and underbrush with subsequent seeding to grass. Outlying slopes are generally unimproved or native range with scattered brush and timber. There are about 115 acres of prime farmlands in the reservoir area (See: Section 3.1.3, Soil and Land Classification). The composition of land use in the Elk Creek subbasin is very similar to that in the remainder of the County. Table 3-12-1 presents the land use summary for the Elk Creek subbasin.

Table 3-12-1. Summary of Land Use in Elk Creek Subbasin.

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Forest land	106,400	62
Farm/forest	38,720	22
Agriculture	24,640	14
All others (urban, etc.)	3,840	2
Total	173,600	100

 Lands in the Farm/forest classification have some of the characteristics of both agricultural and forest lands.

Source: Myers, 1992.

There are about 7,377 acres of arable lands in the project service area based on criteria developed by the Bureau of Reclamation (Myers, 1992). Presently, about 1,533 acres are irrigated, but irrigation flows are frequently curtailed during summer months due to lack of water. About 897 acres of the 1,533 acres require supplemental supplies (Myers, 1992).

3.1.12.2 Impacts to Agriculture

3.1.12.2.1 Construction

Approximately 251 acres of existing farmland would be inundated by the reservoir. Another 100 acres would be needed for the take-line area above the reservoir 775 foot line to provide for flood levels at the 780 elevation, to construct new roads and to provide for recreation facilities. About, 115 acres of prime farmlands would be lost in the reservoir pool area (Figure 3-3-4). The pipeline would be constructed in new and existing road rights-of-way. The pipeline to water users would be both buried and movable surface pipe.

3.1.12.2.2 Operation

The project would allow a full irrigation supply for 2,601 acres by the pipeline distribution system and 1,163 acres by pumping directly from lower Elk Creek. In addition, those lands not now receiving sufficient water (approximately 897 acres) would receive a supplemental supply (Myers, 1992). This would result in a total service to 4,661 acres (Douglas County Water Resources Survey, 1990).

The operation of the project would enhance production to 4,661 acres of arable land in the service area between river mile 39.4

and river mile 0 at Elkton.

Irrigation in the service area would provide a change from present dry pasture, hay production to irrigated clover and alfalfa production. This would allow for substantial increase in livestock carrying capacity, resulting in increased farm income. Irrigation could also permit the production of row crops and specialty crops, such as sugar beets, corn, strawberries, raspberries, blackberries, boysenberries, and wine grapes.

3.1.12.3 Mitigation of Impacts to Agriculture

The loss of 260 acres of agricultural lands by reservoir inundation and the construction of project facilities would be offset by providing increased irrigation water to 4,661 acres of agricultural lands in the service areas.

3.1.13 Timber Resources

3.1.13.1 Existing Timber Resources

There are approximately 364 acres of commercial forest land within the 1,192-acre project take line. The ownership is as follows:

Private	140 acres
County	134 acres
BLM	<u>90</u> acres
Total	364 acres

Size class distribution of timber within the project take-line is shown below:

Seedlings	30 acres
Saplings	90 acres
Sawtimber	<u>244</u> acres
Total	364 acres

Estimated volume of timber on the 244 acres of sawtimber is 4.5 million board feet. The estimated 1991 stumpage value is \$1,080,000.

3.1.13.2 Impacts to Timber Resources

3.1.13.2.1 Construction

Approximately 160 acres of commercial forest lands would be inundated by the reservoir. An additional 20 acres would be cut to provide for a new access road to the base of the dam and relocation of County Roads #7 and #8. Not all the timber within the reservoir would be cut and removed. Approximately 90 acres of timber near the dam and in Walker Creek arm would be left standing, to provide cover for fish and nesting places for waterfowl, eagles, and osprey. An additional 60 acres in the south end of the reservoir and in the wildlife area south of the reservoir would be preserved to provide habitat for wildlife. Construction of the project would result in an estimated timber revenue loss of \$2,620,800 (1991 dollars) over an 80-year rotation period.

3.1.13.2.2 Operation

There would not be an additional loss of timber because of project operation. Operation of the reservoir, with recreational developments, may affect BLM's timber harvesting policy on its lands adjacent to and in view from the reservoir. Timber harvesting could be prohibited or curtailed on these lands.

The Oregon Department of Forestry provided information that the loss of 364 acres of commercial forest land within the project take-line could result in the loss of 2 direct, indirect and induced jobs at the timbershed level and 3.8 total jobs statewide.

3.1.13.3 Mitigation of Impacts to Timber Resources

The loss of 364 acres of commercial forest land per se to the project would not be mitigated. Of this total, 160 acres would be flooded and 20 acres would be removed for road construction and reconstruction. The remaining 184 acres would not be cut, but would be used as scenic buffers near the edges of the reservoir. Douglas County would attempt to locate County owned land that could undergo improvement for timber production to mitigate this impact.

The loss of timber-related jobs would be offset by short-term jobs during construction and operation of the project. Jobs resulting from stabilization or slight economic growth in the areas of Rice Hill, Yoncalla, and Drain would likely offset the loss of jobs.

3.1.14 Wildlife Resources

3.1.14.1 Existing Wildlife Conditions

The subbasin between Elkton and the proposed reservoir supports vertebrate animal species typical of lower elevations of the biogeographical regions in western Oregon. The natural habitat has been greatly altered by land use practices. Specialized habitats such as old growth and mature forests, snags, open water wetlands, and undistributed riparian areas are uncommon or absent. However many wildlife species are associated with the interspersed of several plant communities and the associated edge effect, a high degree of foliage height diversity, and the riparian community which transects the area (Fish and Wildlife Service, 1990).

Big game species that frequent the subbasin include black-tailed deer, Roosevelt elk, mountain lion, and black bear. Of these, black-tailed deer are the most widespread and numerous. Since this area is usually below the snow-line, the area supports year-long populations averaging about 30 deer per square mile. The riparian zone is especially important habitat for black-tail deer. Other species of big game use the project area infrequently because of the extent of human habitation in the area (Fish and Wildlife Service, 1990).

Upland game species include ring-necked pheasant, valley quail, mountain quail, blue grouse, ruffed grouse, mourning dove, band-tailed pigeon, western gray squirrel, and brush rabbit. Wild turkeys have been introduced throughout the area by Oregon Department of Fish and Wildlife. The population has been steadily increasing (Fish and Wildlife Service, 1990).

Nesting waterfowl numbers are low because of the lack of open water and permanent wetland areas with suitable habitat. A few pairs of mallards, wood ducks, and teal species are probably associated with Elk Creek in the proposed reservoir pool area. Mallards, wood ducks and Canada geese nest at farm ponds or log ponds scattered throughout the agricultural areas proposed for irrigation. A variety of waterfowl and shorebirds use the agricultural wetlands for feeding and resting during migration and for a wintering ground, especially if major storms move birds inland. In addition to the above species, teal, pintail, gadwall, coot, widgeon, mergansers, grebes, goldeneye, and scaup would also use the open water and wetland habitats. Wading and shorebirds would include great blue heron, killdeer, sandpipers, snipe, bittern, and rails (Fish and Wildlife Service, 1990).

Furbearers include beaver, skunk, otter, mink, muskrat, raccoon, bobcat, coyote, and gray and red fox. The subbasin supports a variety of nongame wildlife such as numerous small mammals, raptors, passerine birds, reptiles, and amphibians. The

Oregon Department of Fish and Wildlife has an active Nongame Wildlife Program that involves population and habitat inventory and analysis and public environmental education. Species of high interest to the Nongame Wildlife Program that occur in the project area include the osprey, bald eagle, and western pond turtle (Fish and Wildlife Service, 1990).

A limited amount of hunting of black-tailed deer, waterfowl, and upland game occurs throughout the subbasin. The opportunity is limited because of the private lands and residences where hunting is restricted or inconsistent with existing land use. It is estimated that about 100 hunter days occur annually (Fish and Wildlife Service, 1990).

The Fish and Wildlife Service's Habitat Evaluation Procedure (HEP) was used to assess the value of wildlife habitat in the project area (Fish and Wildlife Service, 1990). Because of the lack of controversial issues and no extremely sensitive wildlife resources, a modified HEP process was used. The HEP analysis defines existing conditions and anticipated future without project conditions, expressed in habitat units, for evaluation species specifically chosen for the area. Habitat units are derived from acres of usable cover types and the quality of the habitat as expressed by a habitat suitability index (HSI). A similar analysis is then applied to the anticipated conditions at selected years (target years) during the development and operation of a proposed project. The difference between the two analyses, as expressed in average annual habitat units (AAHU), defines the impacts of the project. Finally, an additional analysis is completed to determine the amount of mitigation that would compensate or offset the impacts over the life of the project.

Seven evaluation species were selected for the HEP study (Table 3-14-1). These evaluation species represent a mix of economically important, public interest, or ecologically important species and represent four cover types associated with the project area. The species were chosen to represent both the existing conditions, the proposed project conditions, and the future without the project ecological conditions. Hence, wildlife species are included that would be associated with the proposed reservoir.

The HSI reflects the quality of an evaluation species' habitat. An HSI of 0.0 indicates no habitat value and an HSI of 1.0 indicates ideal habitat value. As summarized in Table 3-14-2, the HEP study concluded that HSI values for the evaluation species in the existing environment ranged from 0.36 for downy woodpecker to 0.87 for western pond turtle.

Table 3-14-1. Species and Cover Type Association and Acreages for Baseline HEP Conditions, Milltown Hill Reservoir.

Species	Riparian	Grass/ pasture	Shrub/ timber	Stream/ reservoir	Total acreage
Downy woodpecker	188		782		970
Western meadowlark		407			407
Yellow warbler	188				188
Wild turkey	188	407	782		1,377
Black-tailed deer	188	407	782		1,377
Osprey				0	0
Western pond turtle				9	9

Source: Fish and Wildlife Service, 1990.

Table 3-14-2 includes the AAHU for the HEP study evaluation species for baseline conditions within the project area. The AAHU's reflect both the quality and quantity of available habitat. The black-tailed deer, which uses all cover types, also had a relatively high HSI value and accounts for the most AAHU's. On the other hand, the western pond turtle, which also had a high HSI value, had the lowest AAHU's due to a small amount of habitat under present conditions. AAHU's for the other species showed the same relationship between habitat quality and quantity (Fish and Wildlife Service, 1990).

Table 3-14-2. Acres of available habitat, baseline conditions (HSI's and habitat units (HU's) and AAHU's¹).

Evaluation species	Acres of habitat	HSI	HU's	AAHU's
Downy woodpecker	970	0.36	349	349
Western meadowlark	407	0.62	252	252
Yellow warbler	188	0.58	109	109
Wild turkey	1,377	0.48	661	589
Black-tailed deer	1,377	0.80	1,102	1,005
Osprey	0	0.47	0	0
Western pond turtle	9	0.87	8	8

¹ AAHU's represent the average annual habitat units over the life of the project (100 years). Where changes in future without the project conditions occur, the AAHU's are different from the HU's.

Source: Fish and Wildlife Service, 1990.

3.1.14.2 Impacts to Wildlife Habitat

3.1.14.2.1 Construction

The reservoir would inundate 681 acres at normal full pool. The HEP analysis determined the wildlife cover types that would be lost are about 173 acres of riparian, 260 acres grass/pasture, 238

acres of shrub/timber, and 9 acres of stream/open water. About 681 acres of aquatic habitat would be created in the reservoir. On the remaining 706 acres in the take-line, an additional 50 acres would be lost or disturbed by development of the quarry, recreation areas, and road relocation. This includes about 15 acres of grass/pasture, 30 acres of shrub/timber, and 5 acres of riparian. The pipeline would be buried in existing road rights-of-way and minimal habitat would be affected.

Field investigations by Bureau of Reclamation, the USFWS, and County estimated that out of a total of 225 acres of wetlands, about 28 acres were in areas where conversion to agricultural fields could occur due to close proximity within the potentially arable land base. This action would not be permitted by the County. Another 31 acres of wetlands in the reservoir pool area would be inundated.

3.1.14.2.2 Operation

Project operation would have the most pronounced and immediate effects on small animals, such as burrowing rodents, reptiles, and amphibians with limited territories. Individuals of those species would be killed by reservoir inundation. Wide ranging species, such as predators and big game species, would lose a portion of their foraging and breeding habitat, resulting in lowered overall carrying capacity from both loss of habitat and reduced prey base. The project would have a net positive effect on those species associated with open-water habitats such as western pond turtle, beaver, aquatic garter snake, muskrat, and various bat species as well as osprey (Fish and Wildlife Service, 1990).

Impacts would occur to breeding, wintering, and migrating birds associated with forests, woodlands, shrublands, and riparian zones. Habitat would be permanently lost for such species as woodpeckers, warblers, western meadowlark, upland gamebirds, and raptors.

The open water of the reservoir would create 681 acres of habitat for migratory waterfowl. Waterfowl species would nest in dense cover that would become established adjacent to the pool, especially at the upper end of the reservoir. Osprey, bald eagles, and other fish-eating birds would be expected to forage on the increased fish populations. Several pairs of osprey and bald eagles could establish nest territories in the area. The flooded timber areas in Walker Creek arm would also produce increased forage, nesting, and roosting areas for swallows, woodpeckers, wood ducks, kingfishers, and cormorants. Herons, gulls, numerous species of diving ducks, terns, grebes, and shorebirds would use the reservoir and adjacent habitats (marshes, mudflats, and shorelines) that would be created with the project (Fish and Wildlife Service, 1990).

All terrestrial wildlife use of the reservoir inundation areas and the road relocation areas would be lost, while the quarry would be reclaimed and provide some wildlife use. The recreation sites would continue to provide wildlife use, but at reduced acreages and values.

The HEP demonstrated impacts to wildlife in terms of changes to the AAHU's. These changes are determined by comparing future without-the-project conditions against future with-the-project. The reduction of AAHU's are the product of the reduction of acres of terrestrial vegetation cover-types and a partial degradation of certain habitat values, as expressed in habitat suitability indices (HSI). The HEP study also recognized the gained habitat values that would be associated with the upper reservoir's aquatic environment as indicated by increases in AAHU's for osprey and western pond turtle. Changes in AAHU's with the project for each of the evaluation species are summarized in Table 3-14-3 (Fish and Wildlife Service, 1990).

Table 3-14-3. Net Changes in Average Annual Habitat Units (AAHU's) for the Milltown Hill Project.

Species	AAHU's Without Project	AAHU's With Project	Net Change
Downy Woodpecker	349	190	-159
Western meadowlark	252	90	-162
Yellow warbler	109	10	-99
Wild turkey	584	290	-294
Black-tailed deer	1,005	510	-495
Osprey	0	214	+214
Western pond turtle	8	64	+56

Changes assume both direct losses with the reservoir and indirect losses with road relocation, borrow sites, and recreation developments. Also assumes timber retention in portions of the reservoir and wetlands development at the upper end of the reservoir.

Source: Fish and Wildlife Service, 1990.

3.1.14.3 Mitigation of Impacts to Wildlife

Those areas temporarily disturbed by construction activities would be recontoured and revegetated after construction to hasten rehabilitation of the habitat. Native vegetation would be used to the extent possible (Fish and Wildlife Service, 1990).

The loss of 173 acres of riparian vegetation by reservoir inundation, would be mitigated by habitat enhancement on portions of Elk Creek downstream of the project site. Restoration could include plantings and/or fencing in areas where vegetation has been impacted by grazing, brush clearing, and other human activities. The County would develop a riparian program to identify problem

areas, possible remediation efforts, and funding sources with landowners (Fish and Wildlife Service, 1990).

The 28 acres of wetlands in the agricultural area below the damsite would not be affected. The loss of 31 acres in the reservoir area would be mitigated by development of wetlands in the south end of the reservoir. The development of 10 to 15 ponds south of the causeway in this area of the reservoir would result in about 23 acres of wetlands (Figure 2-6). These areas would be contoured and planted with native plants to produce high quality wetlands (also, See: Section 3.1.11, Vegetation). The presence of the island would further increase shoreline areas where wetland vegetation would be planted (Fish and Wildlife Service, 1990).

The timber (about 90 acres) in the north part of the reservoir and in the Walker Creek arm of the reservoir would be left uncut, except for trees which could be dangerous to recreationists, to provide for wildlife use. This would provide an area where osprey platforms and duck boxes would be built.

The loss of game species habitat values (495 AAHU's for black-tailed deer and 294 AAHU's for wild turkey), would be mitigated by securing 767 acres of Columbian white-tailed deer habitat off-site and within the core area for deer. Douglas County would be responsible for initiating landowner incentives, local planning and zoning ordinances, and the active involvement of private organizations and public agencies to secure habitat.

The upstream end of the reservoir would be developed specifically as a wildlife habitat area (Figure 2-5). It would provide both game and nongame mitigation values. About 200 acres would be acquired for habitat improvements and about 120 acres of pool would be maintained for high quality wildlife habitat. This area would support hunting (bird and waterfowl) and other wildlife-oriented recreation. It is anticipated that there would be about 500 hunter-days and 6,500 visitor days (bird watching, photography, and nature hikes) in the wildlife project area each year. Habitat developments and restrictions in the wildlife area include the following:

- No livestock would be allowed.
- Planting of mast producing plants along field edges and fence rows would serve as buffers, escape cover, and forage.
- Snag development and placement of nest boxes and platforms in about 50 acres of timbered areas.
- Development of about 23 acres of permanent, shallow-water ponds and wetland areas at the upper end of the reservoir.

- Creation of submerged piles of woody debris of in-water structural diversity in the mid-pool area.

The HEP analysis demonstrated that the onsite mitigation would provide overall net benefits for two of the evaluation species, the osprey and western pond turtle (Table 3-14-4). The Fish and Wildlife Service and the Oregon Department of Fish and Wildlife agreed that this mitigation is adequate to compensate for losses to nongame species. However, additional mitigation measures would be required for game species (black-tailed deer and wild turkey) (Fish and Wildlife Service, 1990).

Table 3-14-4. Net Results of the Onsite Mitigation Actions.

<u>Species</u>	<u>Net change AAHU's with the project</u>	<u>Net AAHU's with mitigation</u>	<u>Difference</u>
Downy woodpecker	-159	+44	-115
Western meadowlark	-162	+18	-144
Yellow warbler	-99	0	-99
Wild turkey	-294	+92	-202
Black-tailed deer	-495	+86	-409
Osprey	+214	+33	+247
Pond turtle	+56	0	+56

Source: Fish and Wildlife Service, 1990.

Onsite mitigation measures for black-tailed deer and wild turkey are limited because existing habitat quality is already high, and the limiting factor of human disturbance which would not be easily improved with management. The interagency HEP team concurred that game species losses could be mitigated off-site by securing habitat for the endangered Columbian white-tailed deer (See: Section 3.1.16, Threatened and Endangered Species). Although this would be out-of-kind mitigation, the HEP team believed that actions which would secure habitat for the white-tailed deer would also provide habitat values for black-tailed deer and wild turkey (Fish and Wildlife Service, 1990).

Optimal habitat for Columbian white-tailed deer is oak and riparian woodland with a well-developed understory adjacent to grassland. This habitat supports a diversity of nongame wildlife in addition to black-tailed deer and wild turkey. Securing habitat is the only requirement that remains to be met for delisting the species. Presently, about 2,000 acres of secured habitat exist within Federal, County and State lands. The recovery plan identifies a need for 5,500 acres of secured habitat. The additional 3,500 acres could be secured through lease agreements, easements, zone ordinances, and covenants on deeds developed with landowners or through outright acquisition (Fish and Wildlife Service, 1990).

The HEP team determined that securing 767 acres of Columbian white-tailed deer habitat would compensate for the habitat losses of black-tailed deer and turkey.

3.1.15 Fisheries Resources

3.1.15.1 Existing Fisheries Resources

Elk Creek meanders most of its 45 mile length and has a relatively low gradient (less than one percent). Substrate is largely bedrock with little gravel accumulation. It is characterized by a large number of pools and runs with only a few riffles (estimated pool to riffle ratio of 9 to 1). In addition, woody debris and other instream structures are notably absent from the creek except in the uppermost 6 miles. Riparian vegetation is generally present and typically provides excellent shading during summer, especially above Drain (river mile 24). Downstream from Drain, the channel widens and shading is reduced to only a portion of the stream channel (Craven, 1989).

The lack of gravels, riffles, and other instream structures in Elk Creek limits habitat diversity for the production of fish and other aquatic organisms. Spawning and rearing habitat for anadromous and resident fish is sparse, especially during low flows. Late summer flows in Elk Creek are generally less than 5 cfs, and frequently approach 0 cfs, whereas average winter and spring flows are about 800-1,000 cfs at the mouth. The low summer flows and warm climate combine to create warm water temperatures that frequently exceed 75 °F downstream from Drain (Craven, 1989).

The general lack of gravels, other instream structures, and low summer flows indicate that production of invertebrates in the main stem of Elk Creek is probably very low. Most stream productivity is assumed to be from algae and terrestrial invertebrates, with some invertebrate production associated with leaf fall and other detrital input.

Bank erosion is evident (especially between river mile 27 to 35) with steep, high cut banks and mud/silt substrate that contribute to turbidity and sedimentation. During high flow, the water has a very high sediment load. The subbasin has a significant amount of clay and colloidal material. Land and forest management practices in the watershed strongly influence sedimentation and turbidity.

In addition to poor habitat conditions, there is one small irrigation dam (Cunningham Dam) across Elk Creek at river mile 17.5 that could be affecting anadromous fish use of the system. The structure has no fish facilities and there is no record of passage information. It is likely that fish passage could be delayed or

blocked at the dam, especially during low flow periods. Walker Creek, a tributary located upstream of the proposed damsite, has a near vertical waterfall near the mouth that is a natural barrier to upstream passage for fish (Craven, 1989).

Anadromous fish reported to use Elk Creek and its tributaries include fall chinook salmon, coho salmon, winter steelhead trout and sea-run cutthroat trout (Table 3-15-1). The most recent estimates of run size for these species are 15 fall chinook, 500 coho, and 500 winter steelhead (Craven, 1990). No estimates for sea-run cutthroat are available. Of these totals, more than 90 percent of the total anadromous fish production occurs in the tributaries of Elk Creek, with only 5 percent occurring in the uppermost reaches of the mainstem. The exception to this is fall chinook, which occurs only in the lower 10 miles of the mainstem. Major tributaries used by anadromous fish include Big Tom Folly, Brush, Pass, and Yoncalla Creeks. In addition to anadromous fish, other fish that have been found in Elk Creek include rainbow trout, reticulate sculpin, Umpqua chub, redbside shiner, lamprey, and speckled dace (Table 3-15-1).

Table 3-15-1. Fish Species Reported in Elk Creek.

Reticulate sculpin (<u>Cottus perplexus</u>)	Fall Chinook (<u>Oncorhynchus tshawytscha</u>)
Coho (<u>Oncorhynchus kisutch</u>)	Large scale sucker (<u>Catostomus macrocheilus</u>)
Redshine shiner (<u>Richardsonius occulus</u>)	Threespine stickleback (<u>Gasterosteus aculeatus</u>)
Rainbow trout (<u>Oncorhynchus mykiss</u>)	Yellow bullhead (<u>Ictalurus natalis</u>)
Cutthroat trout (<u>Oncorhynchus clarkii</u>)	Smallmouth bass (<u>Micropterus dolomieu</u>)
Umpqua chub (<u>Oregonichthys kalawetseti</u>)	Speckled dace (<u>Rhinichthys occulus</u>)
Winter Steelhead (<u>Oncorhynchus gairdneri</u>)	Lamprey (<u>Lampetra</u> spp.)

Source: Craven, 1989; Doug Markle, pers. comm., Department of Fish and Wildlife, Oregon State University.

Recreational use of the fishery resources of Elk Creek is limited because salmon and steelhead fishing is not permitted, and only local use is made of trout fishing opportunities in the mainstem and some of the tributaries. A total of about 2,000 angler-days presently occur in the subbasin, mostly for rainbow trout (Craven, 1989).

3.1.15.2 Impacts to Fisheries Resources and Habitat

3.1.15.2.1 Construction

The dam would be located at river mile 39.4 on Elk Creek and would inundate about 4 1/2 miles of the main-stem and 2 miles of tributaries. Tributaries upstream of the proposed dam include Walker, Lane, and Shingle Mill Creeks, and several small, seasonal streams. Fish passage facilities are not planned for the dam;

thus, anadromous fish use of areas upstream of the dam would be lost. Based on surveys conducted in the area of the proposed reservoir and the analysis of fishery benefits and impacts, it is estimated that the production of about 50 coho and 50 winter steelhead would be lost annually. Resident fish are expected to continue to exist in the new reservoir.

Resident game and non-game species as well as anadromous species could be affected during construction in the reservoir pool area and downstream. Project activities that could adversely affect fisheries resources would be those activities that would provide barriers to movement or affect water quality, such as the coffer dams and diversion at the damsite, road crossing on Elk Creek, and erosion of sediment or release of contaminants into Elk Creek. Impacts due to these activities are expected to be minor and short-term.

The pipeline to the service area would cross Elk Creek and various tributaries. There would be only minor, short-term impacts on fisheries because construction would occur during low or no flow periods (See: Section 3.1.9, Water Quality).

Water quality impacts, such as increased sedimentation and turbidity from construction in or near the stream would occur. These activities are not expected to significantly affect fisheries resources because of the anticipated short-term nature of the work which would be conducted during summer low flow months.

3.1.15.2.2 Operation

The reservoir would provide good habitat conditions for rainbow trout and/or warm water sport fish. Management by the ODFW would probably emphasize warm water species. Retention of 90 acres of flooded timber in the lower reservoir and in the upper end of the reservoir above the relocated county road would provide good cover and nesting conditions for largemouth bass, bluegill, and bullhead catfish. The development of habitat features (i.e., brush piles, snags, and other large woody debris) and plantings of emergent vegetation in the upper end of the reservoir would also improve habitat for warm water fish. Shoreline spawners, such as warm water fish, could be adversely affected by reservoir pool drawdowns during irrigation season.

Coastal cutthroat trout are native to Elk Creek and there is a good possibility that they will survive in the reservoir and continue to spawn in Elk Creek above the reservoir and in some of the tributaries (Lane, Shingle Mill, and Walker Creeks).

The reservoir trout fishery could be supplemented by plantings of rainbow trout and bass. This is done at nearby Cottage Grove Lake, a Corps of Engineers reservoir on the Coast Fork of the

Willamette River. The bass fishery at the lake is very popular and is managed as a catch-and-release trophy fishery by ODFW. This management reduces the potential for mercury accumulation in humans from eating mature fish which may contain concentrated levels of mercury (Fish and Wildlife Service, 1990).

Due to leaching of mercury ores in the watershed, Cottage Grove Lake has higher than acceptable concentrations of mercury. Only catchable-size rainbow trout are planted at Cottage Grove because of a concern for mercury concentrations in the fish. A similar concern was expressed for the proposed project because of an abandoned mercury mine near Lane Creek. Mercury contamination has been noted in fish from Cottage Grove Lake since 1973. Mercury levels in cutthroat trout in 1975 were 0.26 ppm. Unpublished Oregon Department of Environmental Quality (DEQ) data show that brown bullhead and largemouth bass contained mercury levels in edible portions of flesh of 1.0 ppm and 0.84 ppm, respectively. Therefore, fishermen were warned not to eat more than 1 pound of fish out of the lake each week. DEQ has continued to monitor mercury levels in Cottage Grove Lake; levels appear to be stable and are not considered a health hazard to humans involved in swimming, water skiing, or other water contact activities (Fish and Wildlife Service, 1990).

Because of the concern that similar problems could occur in the Elk Creek drainage, fish from Elk Creek in the proposed reservoir area were sampled for mercury contamination. Mercury concentrations of 16 ppb and 3 ppb were found in two of the three samples taken. EPA recommends that mercury concentrations not exceed 146 ppb for the protection of human health from the toxic properties of mercury through water and contaminated aquatic organisms. While the data from Elk Creek represents very limited sampling, the values indicate that mercury levels in fish in the new reservoir could be higher than background levels found in most other western Oregon waters, but that the levels would probably not equal or exceed those found at Cottage Grove Lake (Fish and Wildlife Service, 1990).

Sport fishing at Cottage Grove Lake accounted for about 52,800 angler-days in 1985 for the 1,137-acre pool. The intensity of fishing use at the proposed project is expected to be less because there would not be the same level of recreational facility development and the reservoir would have a summer drawdown period when the surface area would be decreasing. Operational studies for the project show an average pool elevation of 736 feet and a surface area of 256 acres during September. Also, management actions would restrict boating access to certain areas of the reservoir. The area upstream of the relocated County Road #8 would be nonmotorized access only, while the areas near the dam and in the Walker Creek areas would be restricted to certain motor sizes. Recreation sport fishing at Milltown Hill is expected to average about 6,500 angler-days annually. This assumes an initial stocking

of largemouth bass by the ODFW, and annual stocking of about 3,000 to 5,000 catchable rainbow trout. The warm water fishery is assumed to be self-sustainable and not require future treatment or additional stocking (Fish and Wildlife Service, 1990).

The reservoir would store 24,143 acre-feet of water at normal full pool. Releases would be made for the purposes of irrigation, municipal and industrial water supply and fish enhancement. Up to 7,737 acre-feet of reservoir space would be specifically dedicated to downstream fish enhancement (See: Section 3.1.8, Water Quantity). The project would store water, except for statutory releases and spillway flows, during high flow periods of late fall, winter, and early spring. Storage of water during the high flow period would not adversely affect aquatic resources downstream because releases would still occur above those necessary to protect aquatic life. Although there would be up to 7,737 acre-feet dedicated to fish enhancement, the actual amount available would depend on water year. For example, hydrological analyses for a 65 year period show that the quantity of water available varies. The 50, 75, and 90% exceedence are 6,500, 6,000, and 5,000 acre-feet, respectively (See: Figure 3-8-5, Section 3.1.8, Water Quantity). Although irrigation return flows are anticipated, they are not included in the storage for fish enhancement.

Flow releases would occur at the dam for municipal, industrial and irrigation demands during summer months. Although these are considered project releases, the flows would benefit fisheries resources as well, and would be an improvement over existing conditions of naturally low summer and fall flows (See: Section 3.1.8, Water Quantity). In addition to project flows, there would be fish enhancement flows available for release during summer and fall months (See: Section 3.1.8, Water Quantity). These flows would be released as desired by agreement between ODFW and County. With control over the temperature of the released water, the cooler water and increased flows would substantially improve rearing habitat for anadromous and resident fish in the mainstem of Elk Creek below the dam. In addition, the Yoncalla Valley pipeline would be used to deliver water to the lower 2.5 miles of Yoncalla Creek for streamflow enhancement during the same low flow period.

A low water year (1977) and an average water year (1957) were selected for monthly comparisons of flow during the summer months at various locations (See: Tables 3-8-5 and 3-8-6, Section 3.1.8, Water Quantity). Critical months when flows are low (0-5 cfs) are usually July through September or October, depending on water year. The existing (natural) flows are shown in comparison to project flows, excluding fish enhancement flows. Fish enhancement flows available for each year are also shown. The total project flow is the flow released to satisfy downstream water demands as well as enhancement flows for fisheries resources. Stored releases for fish enhancement would be protected from appropriation by an instream water right. The Oregon Department of Fish and Wildlife

(ODFW) would apply to the Water Resources Department for an instream water right.

The release of enhancement flows for fisheries resources would be flexible to allow the ODFW to manage the resource as necessary in any given year. The time of release would be at the discretion of ODFW and could vary from year to year, depending on management objectives. Flow release could be made to optimize spawning and rearing habitat conditions, primarily for coho salmon, chinook salmon, and winter steelhead. Flows also could be released to provide passage or for attraction of fish into Elk Creek. Releases would be made to provide either additional flows per se or flows to modify the temperature regime or both.

Reservoir water temperatures were simulated for several years (1977 and 1987-1990). The results of simulation show that temperatures of reservoir multiport releases could be maintained between about 40 and 48 degrees F until about October, depending on water year and air temperature regime. By October, the reservoir is low and water temperatures would increase rapidly to about 55°F to 65°F level by November (1977). In October and November, ambient air temperatures are low and stream water temperatures would not be expected to increase. Some decrease could be expected (See: Section 3.1.9, Water Quality).

The reservoir release temperatures were similar for all years modelled except for the high temperature in September 1977. The average reservoir release temperature for each time period modelled was used as an input temperature for the stream model. For September a high temperature (63 °F), representing 1977, was used and a lower temperature (52 °F) representing other years was used. The computer modeling of stream water temperatures indicated that water temperatures would be less than 65°F between the dam to about river mile 10. Downstream of river mile 10, temperature could be above 65°F, depending on year and flow available for enhancement. Releases from the fish enhancement storage would be needed to keep temperature between the dam and river mile 10 less than 65°F, after about July 1. Temperatures could exceed 65°F between Drain and Elkton and could approach 70°F or higher at the mouth.

Increased flow and lowered temperature would significantly enhance fisheries habitat, but existing poor habitat conditions (substrate) in Elk Creek could continue to limit fish production. Accordingly, additional enhancement efforts (Figures 2-5 and 2-6) would be undertaken by Douglas County and would include:

- Placement of 8,000 square feet of spawning gravel one foot deep and provision of woody debris in Elk Creek between RM 39.4 (dam site) and RM 34.4.

- Placement of 33,000 square feet of spawning gravel one foot deep and provision of woody debris in Elk Creek between RM 34.4 and the mouth.
- Placement of a total of 4,000 square feet of spawning gravel one foot deep in the lower reaches of Adams and Yoncalla Creeks.
- Riparian enhancement on 1 to 2 miles of stream to reduce erosion and to provide riparian vegetation.
- Evaluation of the impact of Cunningham Dam at RM 17.5 on fish passage.
- Supplementation of existing anadromous fish populations with juvenile presmolts for at least the first 5 years of project operation.

The schedule for these activities is shown in Figure 2.8, Section 2.2.2.15, Construction Schedule and Work Sequence.

The combination of habitat improvements, increased flows, and improved temperatures would substantially enhance spawning and rearing conditions for anadromous fish in Elk Creek mainstem and in Yoncalla Creek. Also, rearing habitat for anadromous fish that use the tributary stream to spawn would be enhanced as they move into Elk Creek. The spawning escapement of anadromous fish to the Elk Creek system could be about 4,500 adults annually. Table 3-15-2 summarizes the increased spawning escapement of anadromous fish that could occur with the project.

Table 3-15-2. Estimated Increased Spawning Escapement of Anadromous Fish with the Milltown Hill Project, Douglas County, Oregon.

<u>Predicted Escapement</u>	<u>Winter Steelhead</u>	<u>Coho</u>	<u>Fall Chinook</u>	<u>Cutthroat Trout</u>
River Mile 0 - 29	500	800	1,200	400
River Mile 29 - 34	500	600	-	600
Losses upstream of dam	50	50	0	0
Net change	950	1,350	1,200	1,000

The commercial and sport harvest was estimated based on the escapement, catch to escapement ratios, and commercial to sport harvest ratios (Myers, 1992). Table 3-15-3 exhibits the estimated contribution of winter steelhead, coho, fall chinook, and sea-run cutthroat.

Table 3-15-3. Estimated Commercial and Sport Fishery Harvest.

Species	Harvest		Total
	Commercial	Sport	
Winter Steelhead	0	570	570
Coho	3,119	1,607	4,725
Fall Chinook	1,800	600	2,400
Sea-run Cutthroat	0	200	200
TOTAL	4,919	2,977	7,895

Source: Myers, 1992.

3.1.15.3 Mitigation of Impacts to Fisheries Resources

Water quality impacts would be minimized during construction in the reservoir pool area. Various measures would be implemented to reduce runoff of erosional material. Construction in the stream would be minimized and would occur during low flow periods. Periodic discharge flows from settling ponds (less than 1/2 cfs periodically) would be monitored to ensure maintenance of water quality. (See: Section 3.1.9, Water Quality). Construction impacts to existing fisheries resources are considered minor and short-term.

Operation of the proposed project would substantially enhance anadromous fish habitat in the Elk Creek subbasin. A small portion of the subbasin's habitat would be lost upstream of the dam, but increased production from improved flows and temperatures below the dam, in conjunction with the proposed habitat improvements, would more than offset the losses. The new resident fishery in the reservoir, also due in part to habitat improvements, would more than offset losses to the relatively small existing resident trout fishery (Fish and Wildlife Service, 1990).

The analysis of anadromous fish benefits assumes that flows and temperatures would be suitable for spawning and rearing and that they could be managed to optimize habitat conditions. A detailed monitoring and evaluation program would be developed and implemented as part of the project. The program would specify the objective to be achieved, monitoring methods to be used, and how changes to the fish enhancement program would be coordinated and implemented. Results from monitoring would be used to retain strategies that are working and to modify those that are not.

The monitoring and evaluation program would also be used to finalize the locations of some of the habitat improvement measures. Initial habitat improvements would be accomplished between Boswell Springs and the dam and in Yoncalla Creek. The locations of habitat improvements on the mainstem of Elk Creek below Boswell Springs would be based on monitoring temperature and flow conditions that develop during project operation. The monitoring

program would include evaluation of physical, habitat, and biological parameters and would be developed in coordination with Oregon Department of Fish and Wildlife, National Marine Fisheries Service, and Fish and Wildlife Service.

The sequence and timing of implementing the fish enhancement measures are also important. Supplementation with juveniles would be accomplished during project construction (See: Figure 2.8, Section 2.2.2.15, Construction Schedule and Work Sequence). Juvenile releases would include proper acclimation procedures to ensure improved survival. Habitat improvements would be constructed along with project construction so that enhanced fish production can be fully realized as soon as project operations begin. Supplementation would continue through the early years of project operation to assure early achievement of the fish enhancement objectives. These activities would be the responsibility of Douglas County.

Samples of fish would be periodically taken from the reservoir and tested for mercury contamination. A sampling program and schedule would be developed by Douglas County for a 3 year period to evaluate levels of mercury. Results would be evaluated yearly and at the end of the 3-year study an evaluation would be made whether to continue with further analysis on a yearly basis or to decrease the frequency of sampling.

The supplementation program would be developed by Douglas County in consultation with Oregon Department of Fish and Wildlife, Fish and Wildlife Service, and National Marine Fisheries Service. Coho, fall chinook salmon, and winter steelhead would be target species for consideration. Although chinook would not likely go above river mile 10, coho and steelhead may reach the base of the dam. Coho and steelhead would be trapped during project construction and removed to a hatchery designated by Oregon Department of Fish and Wildlife for egg taking. Fish would be reared and released near the base of the dam or at other locations as directed by Department of Fish and Wildlife. These fish would be used for supplementation purposes. The source of fall chinook for supplementation would be determined during project construction.

3.1.16 Threatened and Endangered Species

Pursuant to the 1973 Endangered Species Act, as amended, Bureau of Reclamation initiated Section 7 Consultation by requesting from the Fish and Wildlife Service a list of threatened and endangered species that may occur in the project area. A request was made by the Bureau of Reclamation in 1986 and again in 1991. The Bureau of Reclamation received 2 lists that included species that could occur in the project area. These are the Columbian white-tailed deer (endangered), the bald eagle

(threatened), and the Northern spotted owl (threatened). The Fish and Wildlife Service also included candidate species. These are a plant species (rough allocarya), a fish (umpqua chub), and a turtle (western pond turtle). The Oregon chub (Hybopsis crameri) was cited by the Fish and wildlife Service as a Category 2 species in their 1986 correspondence. In their 1991 correspondence, they substituted the Umpqua chub. In addition, the Oregon Natural Heritage Program was contacted for a search of their records. They did not have any threatened or endangered species in their records for the project area. (See: Appendix F, Threatened and Endangered Species).

3.1.16.1 Listed Species

3.1.16.1.2 Columbian White-Tailed Deer

A population of Columbian white-tailed deer, known as the "Roseburg Population," occurs in Douglas County mainly along the North Umpqua River between Glide and Wilbur. The reservoir pool area has not been identified to be in the core habitat by Oregon Department of Fish and Wildlife. The habitat is not considered to be critical by the Fish and Wildlife Service (Fish and Wildlife Service, 1990). The population has been expanding its core range northward and could conceivably extend its range into the Elk Creek drainage. Individual white-tailed deer that have been marked to study their distribution have been recently observed in the Elk Creek drainage near the reservoir site (pers. comm. George Kister, ODFW, Roseburg District).

Columbian white-tailed deer inhabit a variety of habitat types including grass-shrub, oak woodlands and conifers. Lowland riparian zones are probably the most important habitat type for all life stages of the species and serve as corridors for dispersal and geographic expansion. Understory shrub vegetation is an especially important component of their habitat (Fish and Wildlife Service, 1990).

The Roseburg population is currently estimated to be about 6,000 white-tailed deer. This level exceeds the requirements for downlisting the species from endangered to threatened. The only requirement that has to be met for delisting the species is to provide 5,500 acres of secured habitat. Habitat is considered to be secured only if it is protected from adverse human activities (e.g., heavy unregulated grazing by domestic animals and clearing of woody plants, for example) in the foreseeable future, and is relatively safe from natural phenomena that would destroy its value to Columbian white-tailed deer. The Columbian white-tailed Deer Recovery Team has formulated an approach for securing the required habitat. Since most core habitat is on private land, the most effective way of securing habitat is by obtaining cooperative

agreements such as covenants on deeds or perpetual conservation easements (Fish and Wildlife Service, 1990).

3.1.16.1.3 Bald Eagle

Bald eagles nest and winter throughout Oregon. There have been about 11 active bald eagle nesting territories in Douglas County, including one on the North Umpqua River northeast of Roseburg, but they are not known to use the project area. According to the Pacific Bald Eagle Recovery Plan, the primary threats to bald eagle populations in the Umpqua Basin include logging, human disturbance, and shooting (Fish and Wildlife Service, 1990).

3.1.16.1.4 Northern Spotted Owl

The project area is within the range of the northern spotted owl. A survey was initiated in 1991 by Douglas County to determine if owls exist within 1½ miles of the proposed dam site. No owls were located. The Fish and Wildlife Service has published in the Federal Register a Revised Proposed Determination of Critical Habitat for the northern spotted owl (FR Vol 56, No. 156). This revised proposed determination eliminates all private lands, tribal lands and most state-owned lands which were listed in the May 6, 1991 designation. The August 13, 1991 determination indicates no federal lands in the Milltown Hill Project area are classified as critical habitat for the owl. The Fish and Wildlife Service published a final decision on the proposed designation of critical habitat for the owl in January 1, 1992. Based on a review of maps, no project lands are in critical habitat.

3.1.16.2 Biological Assessment

For compliance with Section 7 of the Endangered Species Act of 1973, Bureau of Reclamation prepared a biological assessment for the listed species (November 5, 1987). Although the peregrine falcon (endangered) was not included in the Fish and Wildlife Service correspondence, it was addressed in the biological assessment and a conclusion made that it would not be adversely affected. The biological assessment concluded that the project would not negatively affect bald eagles. Since the Columbian white-tailed deer was not found in the project area, the project would have no impact on existing populations. The impact evaluations for bald eagles and Columbian white-tailed deer in 1987 were as follows:

Following construction, bald eagles may be attracted to the reservoir due to an increased forage base of fish and waterbirds. Bald eagles could nest in some of the larger

trees left on the timbered ridges above the project site.

Habitat that is potentially suitable for the Columbian white-tailed deer would be reduced 681 acres by reservoir inundation. This habitat is also suitable for black-tailed deer.

The Fish and Wildlife Service concurred with these conclusions.

The biological assessment was updated in November 1991 and addressed Columbian white-tailed deer, bald eagle, peregrine falcon, and northern spotted owl (See: Appendix F, Threatened and Endangered Species).

The biological assessment was reviewed by Fish and Wildlife Service. They responded in a December 12, 1991, letter stating that, based on the information in the assessment, they concur that the proposed project would not likely adversely affect Columbian white-tailed deer, bald eagle, peregrine falcon, or northern spotted owl (See: Appendix F).

3.1.16.3 Unlisted and Candidate Species

3.1.16.3.1 Plants

No threatened and endangered plant species have been reported on the project area by Fish and Wildlife Service or Oregon Natural Heritage Program. Although the Pacific yew is not a Federal listed species, County requested an evaluation because of its importance in medical research. Pacific yew trees have been located on BLM lands in the project area and have been harvested (pers. comm., Lowell Hayes, Bureau of Land Management, September 5, 1991).

Rough allocarya is a Federal Candidate Species (Category 1). A Category 1 taxa is one for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened. The Fish and Wildlife Service is preparing a proposal for review that would list rough allocarya as an endangered species (pers. comm., Robert Parenti, March 5, 1992). The species has not been reported in the area by Fish and Wildlife Service or the Oregon Natural Heritage Program, however a survey would be conducted within any affected potential habitat. If the species is found to occur in the inundation zone, consultation would be initiated with the Fish and Wildlife Service.

3.1.16.3.2 Umpqua Chub

The Umpqua chub occurs in a spotty distribution pattern throughout the Umpqua River system, including the lower reaches of

Map of Douglas County, Oregon, showing section numbers 3, 4, 5, 10, 15, 16, 21, 22, 23, 27, 28, and 29. The map includes the Milltown Hill Damsite, Oak Canyon Road and Pipeline, Elwood Road, South Main Road, County Road No. 8, and the Take Line. A scale bar indicates 1/2 mile and 1 mile. A legend identifies BLM (Public Domain) and BLM (O&C Lands) areas.

1.7 miles to
Hobart Butte
Quarry

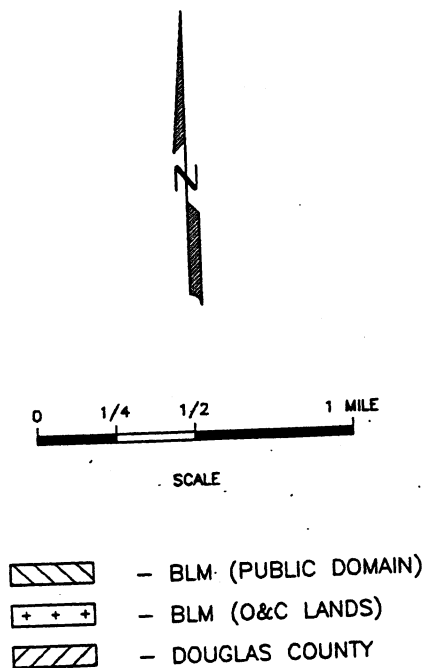


FIGURE 3-20-1
MILLTOWN HILL PROJECT
LAND OWNERSHIP

- Pass Creek Park, located near Curtin on Interstate 5, 8 miles north of the project area, contains 30 camping units, picnicking, playground, fireplaces, showers and toilets.
- Anna Drain Park, located in the city of Drain, and maintained by the city, is a small park, having a playground, picnicking, drinking water and toilet facilities.

Dorena Lake and Cottage Grove Lake, two large impoundments, are located in Lane County, approximately 30 miles north of the project area. Plat I Reservoir and Cooper Creek Reservoir are located near Sutherlin about 20 miles south. These lakes have picnicking and camping facilities, and provide fishing and other flat water recreational opportunities.

3.1.17.2 Impacts to Recreation

Douglas County would construct 2 recreation facilities on the shores of the Milltown Hill Reservoir (Figure 2-4). The larger facility, located on the east shore, would provide the following:

- Access roads
- Caretaker facilities
- Launch ramp and trolley dock
- Individual and group picnic sites
- Restrooms
- Parking for 61 single vehicles and 40 vehicles with trailers
- Pavilion with electrical outlets
- Well and water treatment facilities
- Overnight camping area (future development)

The second facility would be constructed on the west shore of the reservoir. It would consist of a boat ramp and parking for 29 vehicles with trailers, or 62 single vehicles, pit toilets and 5 picnic sites (Horn, 1990).

The reservoir would experience about 53,000 recreational use-days per year (Table 3-17-1). The anadromous sport fishery in the Umpqua River and in the ocean would be enhanced by the project. Sport catch is estimated to be about 2,977 winter steelhead, coho, fall chinook and sea-run cutthroat (See: 3.1.15, Fisheries Resources).

Table 3-17-1. Anticipated Reservoir Recreation Use.

<u>Facility Based Use</u>	
<u>Recreation</u>	<u>Number Days</u>
2 Boat Ramps ^{1/}	10,000
52 Picnic Units	20,000
Fishing Days	6,500
Subtotal	36,500
<u>Non-Facility Based Use</u> ^{2/}	16,500
Total	53,000

1) Assumes east ramp would receive the majority of spring/early summer use, and west ramp would receive moderate spring/early summer and late summer use.

2) Sightseeing, hiking, wildlife observation, dispersed picnicking.

Source: Bureau of Reclamation, 1991.

Adverse impacts to recreational activities would be the loss of an estimated 100 hunter-days annually for upland game in the reservoir pool area. In addition, an estimated 1,000 angler-days would be lost annually in the 4.5 miles of Elk Creek which would be inundated by the reservoir.

Use of the reservoir and surrounding area by recreationists would create minor adverse impacts to local residents (See: Sections 3.1.7, Noise; 3.1.20, Land Use; and 3.1.22, Transportation).

3.1.17.3 Mitigation

Impacts to the existing limited sport fishery would be mitigated by the new warm-water and trout fishery in the reservoir. Improvement of fish habitat downstream from the dam would benefit the trout fishery and would more than offset the losses. The project would provide a new and significant source of public recreation in northern Douglas County. The loss of 100 hunter-days annually for upland game would be mitigated by the 500 hunter-days for bird and waterfowl hunting (See: Section 3.1.14.3 Mitigation of Impacts to Wildlife). The reservoir would have the potential of attracting large numbers of waterfowl. The harvest of migratory waterfowl would offset the loss of existing upland game hunting opportunities.

3.1.18 Cultural Resources

3.1.18.1 Existing Cultural Resources

Little is known of the prehistoric inhabitants of the Umpqua River drainage. Archeological excavations indicate the area has

been in use since the Paleo-Indian period (before 10,000 years ago). However, archeological evidence of occupation does not become abundant until about 6,000 to 4,000 years ago. Available information indicates that prehistoric inhabitants followed a settlement-subsistence system involving seasonal migration from lowland villages to upland task-specific camps. At Euro-American contact around 1810, the resident Native Americans were practicing a hunting-gathering economy that utilized available fish, game, and plant resources (Beckham and Minor, 1988).

The Milltown Hill reservoir area and other project lands would be associated primarily with the lowland aspect of this settlement-subsistence system. Valley terraces above the flood elevation may contain remnants of winter village sites spanning thousands of years of use. Remnants of short term camps may also be present where inhabitants returned to harvest seasonally available plant foods or to catch anadromous fish.

Upper Elk Creek drew Euro-American settlers as early as 1855. By 1866, five donation land claims had been patented within the proposed reservoir pool area, and 16 families lived in the general area. Around 1870, the Elkhead Mine was opened and remained in operation through 1971. However, census records indicate that farming and stockraising have always been the primary economic activity for area residents. In 1877, the Elkhead Post Office was opened, and in 1886 a school was built. The small town of Elkhead subsequently grew around these structures and remains today as a community of 10 to 12 residences (Beckham and Minor, 1988).

In 1988, a Class I literature search was conducted to identify the potential cultural resources sites or structures in or near the project area (Beckham and Minor, 1988). Eighteen historic structures, features, and homestead locations were identified from document research. Local residents also reported the presence of two prehistoric archeological sites within the reservoir pool area.

In 1989, a Class III cultural resources survey was completed for the areas within and around the Milltown Hill Reservoir project. A significantly larger area was surveyed than would be affected by project development, because the proposed reservoir elevation was reduced after the archeological survey occurred. Approximately 2,000 acres were surveyed, encompassing all areas now to be affected by the reservoir pool and its operation, adjacent recreation and wildlife mitigation areas, construction staging areas, road relocations, and all other areas that would be acquired by the County as part of the project. About 206 acres were surveyed downstream of the damsite, for the pipeline right-of-way (ROW). One-hundred percent of the area within the project takeline was surveyed at the Class III (intensive) level, with survey intervals spaced 15 to 20 meters apart. Survey methods and results are detailed in Minor and Beckham (1990).

Visibility was excellent in the pipeline right-of-way; it passes primarily through plowed fields or adjacent to existing roads. No sites were recorded in these areas, and it is unlikely that undetected resources are present. Visibility, however, was poor in the inundation area due to dense vegetation. Three prehistoric archeological sites were recorded in locations where the vegetation had been removed (sites 35D0449, D0450, and D0451). Only a few flakes from stone tool manufacture were found at each site. A fourth prehistoric site was reported by local residents to be present in a farm yard near Elkhead. One historic archeological site, a dugout depression, was recorded within the reservoir pool as site ORDO6. The Sarah Coats Homestead (site ORDO5) was recorded immediately outside of the project take-line. Test excavations are needed at all sites within the take-line to determine if they contain deposits that make them eligible to the National Register of Historic Places (the Register).

During the Class III inventory, all standing structures approximately 50 years or older were recorded. Twelve historic structures were recorded within the project impact area, including houses, barns, and other outbuildings dating from the early 20th Century. Minor and Beckham (1990) who recorded these structures, recommended that none are eligible to the Register, and Bureau of Reclamation concurs with this assessment. Consultations about the structures' eligibility have been initiated with the Oregon State Historic Preservation Office (SHPO). SHPO has concurred that six of the 12 structures are not eligible to the Register. SHPO asked for additional information about the remaining structures before offering a determination. The information is presently being obtained from the contractor. When the forms have been revised, they will once again be submitted to the SHPO for evaluative comment.

In 1991, the County determined that a causeway was necessary across Elk Creek as part of road relocations associated with Milltown Hill Reservoir. Minor and Beckham (1990) had recorded no sites there, but surface visibility had been limited. Bureau of Reclamation and the SHPO determined test excavations were necessary to clearly determine if significant archeological deposits were present. Therefore, in August 1991, the County contracted for subsurface test excavations in the causeway location. Archeological site 35D0478 was discovered within the causeway location on the east side of Elk Creek (Roulette, Fagan, and Mills 1992). The site appears to be a small, single component site, probably dating to the Late Archaic Period. Bureau of Reclamation and the SHPO have determined that D0478 is eligible to the Register, and that archaeological excavation is necessary to mitigate adverse project effect on the site. Consultations have been initiated with the Advisory Council on Historic Preservation (the Council) about project effect and appropriate treatment.

As indicated above, survey visibility was poor in the

reservoir area. Therefore, Bureau of Reclamation required that test probing occur in the inundation areas likely to contain undetected deposits. Ultimately, 17 areas were tested in the project area (Fagan 1992). These areas were selected because they appeared to have the highest probability to contain subsurface sites, as indicated by an analysis of the distribution of recorded sites in the region. These locations also encompassed the range of valley environmental zones, including different stream terraces, stream confluence parameters, and sections of the valley. Auger probes and 0.5 by 0.5 meter test units were excavated in these areas; the intensity of testing was low, intended only to determine if cultural material was present, and formal test excavations warranted. Fifteen of the 17 areas probed yielded cultural material. Formal test excavations would be needed at these locations to determine if deposits are present that are eligible to the Register. Preliminary information indicates that at least several of the locations contain significant cultural deposits. A particularly significant area is the vicinity of the confluence of Lane and Elk Creeks.

In 1992, the County will initiate formal consultations with interested Native American's about potential project effects upon sites of traditional value to the tribes. Consulted tribes would be the Cow Creek Band of Umpqua Tribe, Confederated Tribe of Grand Ronde, and Confederated Tirbes of Siletz. Consultations would include a written request that the tribes indicate if they are aware of sites of traditional value within the project impact area. If a tribe responds that they are aware of traditional resources that would be adversely affected by the project, then meetings would be initiated with the concerned group to identify the areas of concern, and determine means to address the concern. Also, a general policy would be developed, in consultation with the tribes, about how to deal with human burials, if such are encountered during archeological excavations or during construction of project features.

3.1.18.2 Impacts to Cultural Resources

All actions taken to address potential project effects to archeological, architectural, of traditional resources shall be conducted in accordance with 36 CFR 800.

Bureau of Reclamation and the SHPO have determined that site 35DO478 is eligible to the Register. The site would be destroyed due to project-related road construction. In the summer of 1992, 35DO478 would be archeologically excavated in accordance with a mitigation plan approved by the SHPO and the Council.

Until systematic, formal test excavations are completed at the other recorded sites and the locations that probing indicate contain cultural material, it is not possible to fully assess

project effects upon archeological resources. Systematic test excavations will begin in 1992, and may extend into 1993. It is expected that additional archeological sites will be discovered and may be eligible to the Register. These sites could be adversely effected by the project. Adverse effects could occur through damage or destruction during construction, or from inundation. Effects from inundation could include accelerated decay of organic materials from wet and dry cycles associated with reservoir operation; contamination of environmental samples from saturation; erosion of the site matrix from reservoir operation or from currents in the pool; or effects from altered or increased use of the area by recreationists or other groups.

Consultations with the SHPO would be completed for six historic structures. If the SHPO determines that any of these structures are eligible to the Register, then its alteration or destruction would be an adverse project effect, and mitigation might be required.

Sites of traditional cultural value to Native Americans may be present, and could be adversely affected through destruction, restriction of access, or introduction of incompatible features or activities nearby.

3.1.18.3 Mitigation of Impacts to Cultural Resources

If test excavations indicate any archeological site is eligible for the Register, then means to avoid or reduce the adverse project effect will be investigated. Where adverse effects cannot be avoided, the adverse effect will be mitigated through data recovery. A site protection and mitigation plan would be developed and presented to the SHPO and the Council for review and approval. A Memorandum of Agreement (MOA) for impact mitigation actions would be signed by Bureau of Reclamation, Douglas County, the SHPO, and the Council. Native American tribes would be consulted regarding treatment of human remains and other objects, consistent with requirements in the Native American Graves Protection and Repatriation Act of 1990.

If a standing structure was determined eligible for inclusion in the Register, means to preserve the structure would be sought. If preservation was not feasible, its historic and/or architectural characteristics would be documented. These actions would also be addressed in the site protection and mitigation plan and the MOA described above.

If sites or resources of traditional value to Native Americans were in the project area, Bureau of Reclamation or Douglas County would consult with the appropriate tribe to determine means to avoid or reduce the effect to an acceptable level. If these

measures would not be sufficient, then means to mitigate the effect would be sought, in consultation with the tribe.

Prior to beginning the project, Bureau of Reclamation would assure that Douglas County completes test excavations to determine site significance, as well as consultations with the SHPO, Council, and appropriate tribes in accordance with Section 106 of the National Historic Preservation Act of 1966 pursuant to the Council's regulations, "Protection of Historic Properties" (36 CFR Part 800). Bureau of Reclamation would assure that Douglas County completes any actions required as a result of consultations prior to any ground disturbance at areas that may contain sites.

3.1.19 Visual Resources

3.1.19.1 Existing Visual Resources

The general character of the reservoir pool area is that of a rural agricultural setting. There is a mixture of fenced pasture land, woodlands, shrublands, and forested slopes. The dam site is located in an area recently logged, which cannot be seen from either County Road #7 or County Road #8.

The winding nature of Elk Creek and narrowing of the canyon on either end of the proposed reservoir pool area serves to break visibility up and down the creek. Much of the valley has been greatly altered by private land owners. On most properties, portions of the natural vegetation on flat, low-lying lands have been replaced with introduced grass species. Three high voltage power lines traverse the upper portion of the reservoir pool area which detracts from the local rural, agricultural setting.

The overall viewer sensitivity could be rated as low. Most of the viewers are local residents, many of whom regard the Elk Creek area as scenic because of its relatively isolated rural, pastoral setting.

Seasonal flow conditions downstream of the proposed damsite present less than satisfying visual reactions. High flows during winter and spring result in bank overflows and minor flooding. Low summer and fall flows result in dry or nearly dry creek beds, especially in the area from Drain to Elkton. These seasonal flow conditions detract from the otherwise high visual quality presented by Elk Creek. Many pools in lower Elk Creek become stagnant during low flows, resulting in accelerated algae growth and unpleasant smells.

The Bureau of Land Management has classified the lands that it administers in and near the proposed reservoir (See: Figures 3-19-1, 3-19-2) as Visual Resource Management (VRM) Class IV (BLM Manual

8440). This VRM class allows for modification and the lowest level of protection. Landscape alterations may dominate the view and may be the major focus of viewer attention. Scenic quality may be modified. This class generally includes areas with low scenic qualities and medium to low sensitivity levels, which are seldom seen from major traveled routes. The level of change to the characteristic landscape can be high (pers. comm., Kirk Casavan, BLM Roseburg District, September 6, 1991).

3.1.19.2 Impacts to Visual Resources

3.1.19.2.1 Construction

Reservoir clearing and road and dam construction would adversely affect the existing visual quality of the area since most of the existing vegetation in the reservoir pool area would be cut, piled and burned except for timber in Walker Creek and the north end of the reservoir and that south of the causeway. Construction of the pipeline distribution system would not cause significant adverse visual impacts because it would be constructed in existing road rights-of-way.

3.1.19.2.2 Operation

Operation of the project would create both favorable and adverse impacts to visual quality. At normal full pool, the reservoir would present a welcome vista to picnickers and fishermen. As drawdown increases during the irrigation season (April 1-October 30), the shoreline of the reservoir would become increasingly visually less attractive, perhaps even to the point where picnickers may avoid the recreation sites. At lowest possible drawdown condition, approximately 45 vertical feet of shoreline would be exposed, and approximately two miles of the southern portion of the reservoir pool area would have the appearance of a mud flat (Figures 3-19-1 and 3-19-2). The portion of the reservoir south of the causeway would preserve about 10 to 15 areas where water would form pools as a result of enhancement to wetlands (See: Section 3.1.14, Wildlife Resources). In addition, an island forming the base for the 500 KV line would be centrally located in the southern portion of the reservoir. Three existing major powerlines cross the southern part of the proposed reservoir area, however they are not associated with the proposed project.

The impacts to the stream below the dam would be favorable because summer flows would be increased substantially (See: Section 3.1.8, Water Quantity and Section 3.1.9, Water Quality). The increase would be visually more acceptable than present conditions. With project-controlled flows, the magnitude of winter and spring floods would be decreased, creating a more acceptable visual

TOWNSHIP 23 SOUTH, RANGE 4 WEST

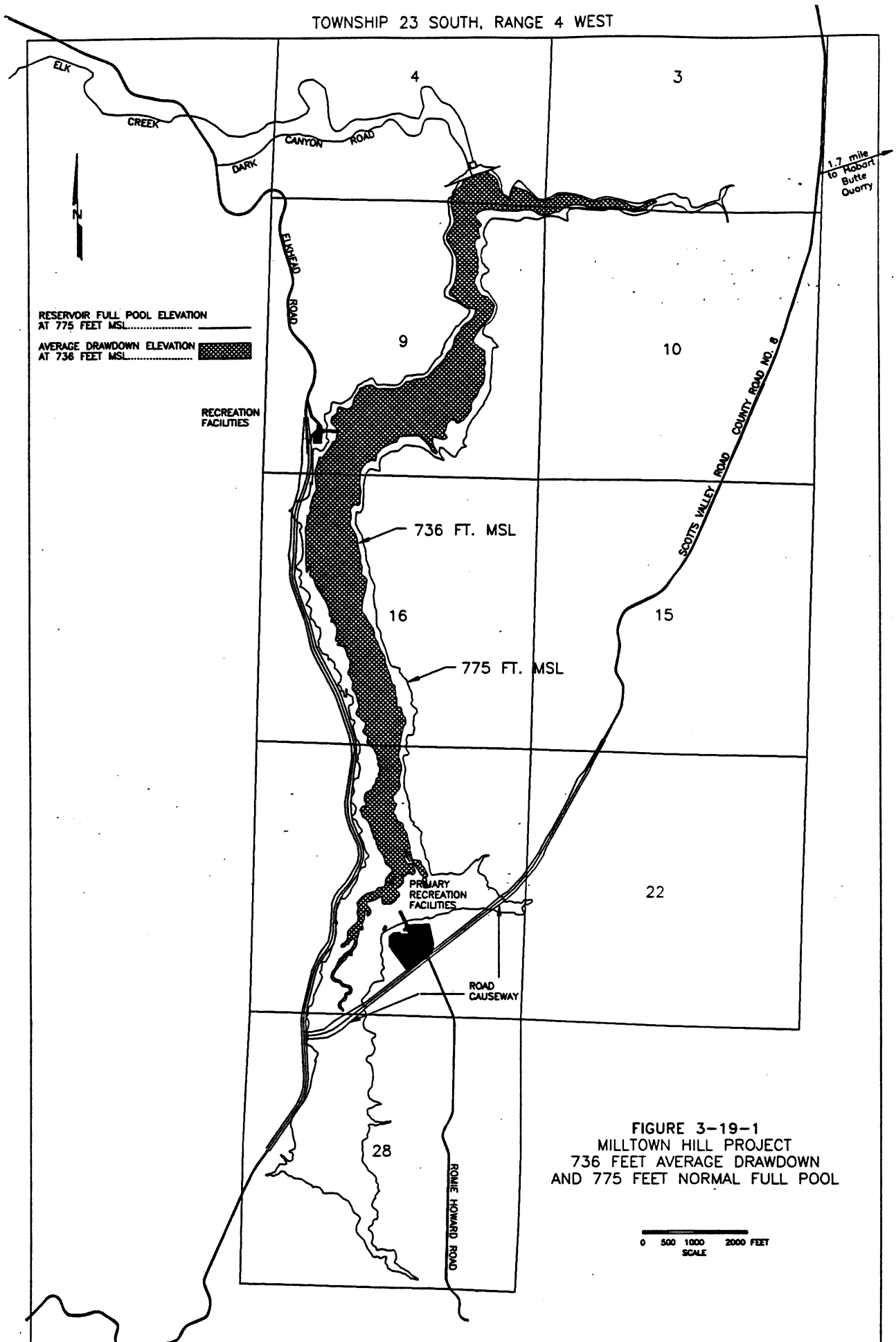
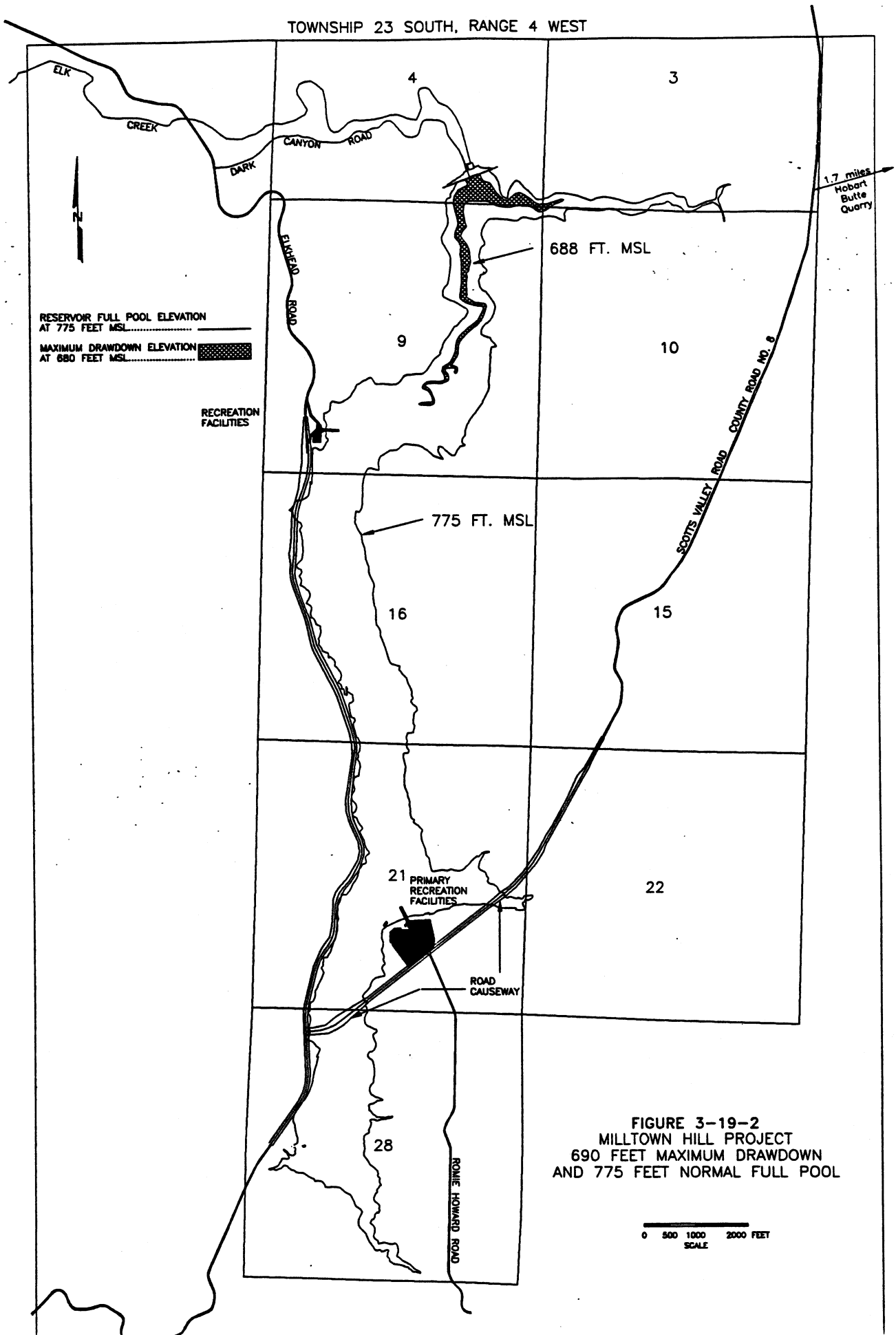


FIGURE 3-19-1
MILLTOWN HILL PROJECT
736 FEET AVERAGE DRAWDOWN
AND 775 FEET NORMAL FULL POOL

TOWNSHIP 23 SOUTH, RANGE 4 WEST



condition of Elk Creek.

No adverse impacts are anticipated in the pipeline or creek service areas during project operation.

3.1.19.3 Mitigation of Visual Quality Impacts

During the construction period little could be done to mitigate visual quality impacts. By its nature, the project requires major changes to a natural setting. The seasonal mitigation of a full or near full reservoir during the winter and spring months would only partially mitigate the visual quality of the project during the summer and fall seasons. The presence of the island and pool areas south of the causeway and the vegetative enhancement of these pool areas for wetlands would mitigate to some extent, the mud-flat appearance expected at low reservoir levels.

3.1.20 Land Use

3.1.20.1 Existing Land Use

Land in the Elk Creek subbasin is used primarily for agriculture in the lower elevations (under 800 feet msl) and for timber production in the higher elevations. Most of the forest lands are privately owned and have been harvested at least once. Land use within the watershed of the project dam is primarily forest (63%), farm-forest (21%), and farm-grazing (16%). Forest lands are split primarily between Federal (52.8%) and private owners (44.7%). The remaining 2.5% is owned by Douglas County. Farm forest lands comprise 21% of the land use and about 93% are under private ownership (Table 3-20-1).

Table 3-20-1. Land Use and Ownership within the Watershed of the Proposed Milltown Hill Dam.

LAND USE	OWNERSHIP (ACRES)			TOTALS	PERCENT
	FEDERAL	COUNTY	PRIVATE		
Forest	6,500	300	5,500	12,300	63
Farm-forest	---	300	3,800	4,100	21
Farm-grazing	---	---	3,100	3,100	16
Totals	6,500	600	12,400	19,500	100
Percent	43	3	64	100	---
Source: Douglas County Planning Department, 1991.					

Within the reservoir take-line (1,192 acres), there is a

mixture of Douglas County, BLM, and private land ownership (Figure 3-20-1). Most timber stands are in various stages of regrowth; some are up to 25 to 40 years of age. A small amount of public timber has also been cut. Federal public lands are managed by the Roseburg District of the Bureau of Land Management. These lands are Public Domain lands managed under the authority of the Federal Land Policy and Management Act (FLPMA), and Revested Oregon and California Railroad Grant Lands managed under the authority of the Act of August 28, 1937 (O&C Act). Under the O&C Act, these lands were set aside for permanent timber production. The Roseburg District published a Management Framework Plan (MFP) in 1983, specifying that lands under its jurisdiction in the Elk Creek subbasin are to be managed primarily for timber production. The MFP is presently being updated and is scheduled to be replaced by a Resource Management Plan (RMP) in 1993.

The agricultural lands are used as pastures for sheep and other livestock. Hay is grown in the bottoms along the stream course. Land use within the portions of the subbasin that are suitable for irrigation is almost exclusively used as grass pasture, hay or combination pasture-hay. A very minor acreage is in wine vineyards, orchards and Christmas tree farms. A significant acreage of the alluvial lands have been improved by clearing of timber and undergrowth, leveled and subsequently seeded to grass-clover mixes such as perennial ryegrass and white clover. The residual soils on the outlying slopes have generally unimproved native range grasses with scattered brush and timber. There are no Prime or Unique farmlands in the irrigation service area according to the SCS. The reservoir area was surveyed for Prime and Unique farmlands in 1991. A total of 115 acres were classified as having soils qualified as Prime farmlands (Figure 3-3-4).

A minor portion of the Elk Creek subbasin is occupied by the towns of Drain, Elkton, and Yoncalla. Another small portion is occupied by Interstate 5 and other minor State and County roads, and a railroad right-of-way. An electrical utility corridor transects the project area in the vicinity of the proposed reservoir.

3.1.20.2 Impacts to Land Use

3.1.20.2.1 Construction

Construction of the Milltown Hill project would immediately change land uses on 681 acres in the reservoir site and the adjacent 512 acre "take" area. There would be a change of use from present farming and timber production to a water storage facility, with the dam and ancillary recreational facilities. Portions of County Roads #7 and #8 would be relocated. At least 10 residences with outbuildings would be moved or destroyed. The installation of

TOWNSHIP 23 SOUTH, RANGE 4 WEST

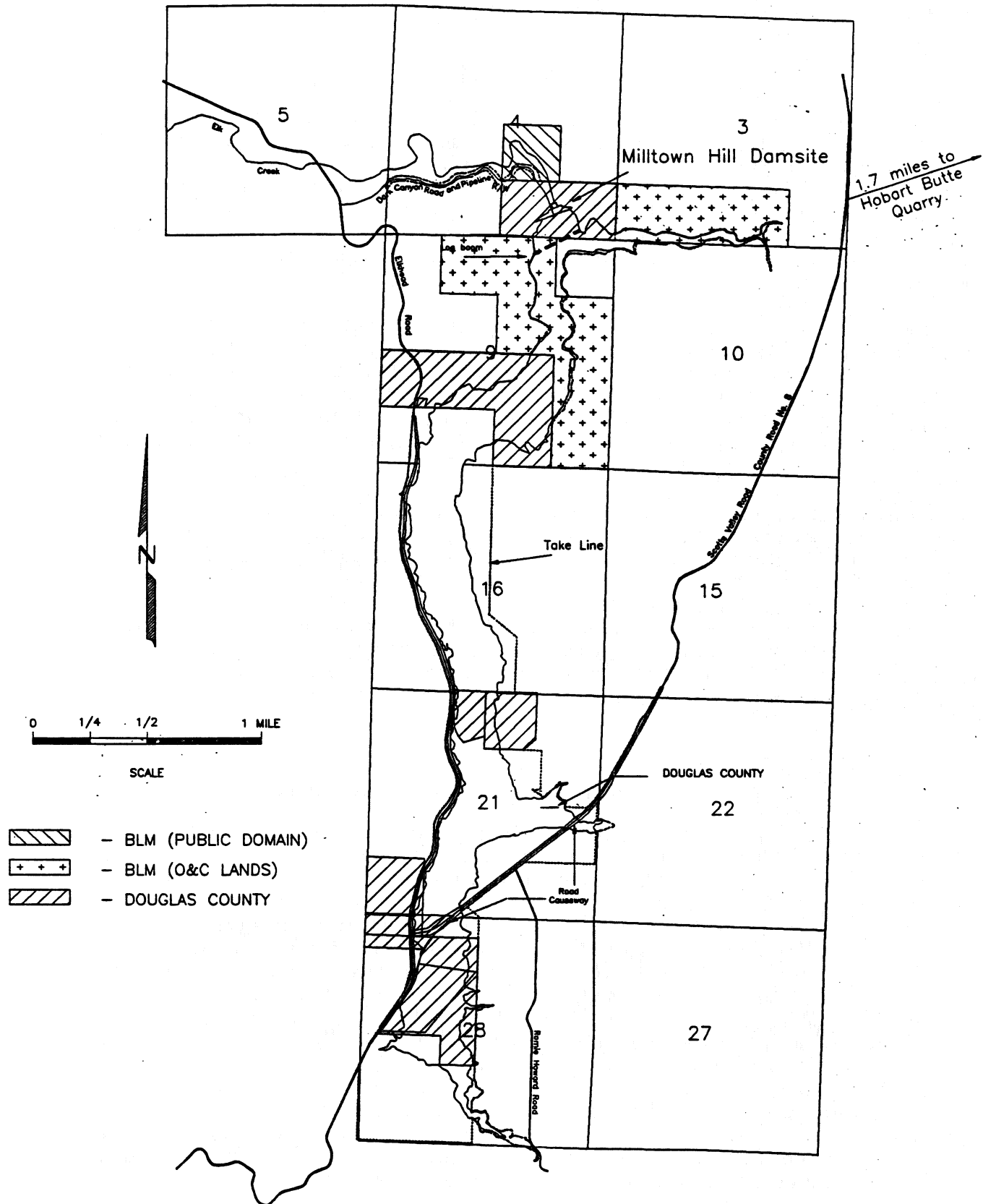


FIGURE 3-20-1
MILLTOWN HILL PROJECT
LAND OWNERSHIP

Metropolitan Statistical Areas, Douglas County has the largest civilian Labor Force in Oregon, with the January, 1991 level being 44,320. The unemployment rate for the same period for the County was 12.7%, ranking third highest among Oregon counties; nearly double the statewide figure of 6.8% and the national value of 7%. Thus, Douglas County possesses all the primary resources necessary for further economic development and opportunities for diversification, except for a reliable water supply. With the project, that resource will become available (Myers, 1992).

3.1.21.2.2 Operation Impacts

3.1.21.2.2.1 Annual Benefits

The estimated annual benefits from operation of the project are approximately \$2,330,432 as shown in Table 3-21-8. These estimates were derived during project evaluation for each project function (Myers, 1992).

Table 3-21-8. Annual Benefits from Project Operation.

<u>Project Function</u>	<u>Annual Benefit</u>
1. Irrigation	
Pipeline Service Area	\$250,290
Elk Creek Service Area	82,810
Total	\$333,100
2. Municipal/Industrial	
Pipeline Service Area	\$881,860
Elk Creek Service Area	269,330
Total	\$1,151,190
3. Anadromous Fish	\$355,342
4. Recreation	342,500
5. Flood Control	148,300
	=====
TOTAL	\$2,330,432

Source: Myers, 1992.

3.1.21.2.2.2 Increased Farm Income

The opportunity to supplement farm family income with sustained increases in livestock, hay and pasture production through additional irrigation would alleviate several problems facing the County. The steady and increased income would sustain and revitalize the retail and service industries, softening the seasonal, cyclical adverse impacts of timber industry employment. The increased farm income would supplement income presently received from manufacturing or other timber dependent activities.

3.1.21.2.2.3 New Industries

A year-round water supply could also be used to strengthen non-timber related industries and attract a few new industries to the local area, especially Yoncalla, Rice Hill, and Drain. Yoncalla

employment in Douglas County and emphasized the dependence of the industry on national economic conditions and the cyclical variations which impact the industry. National concern for the dwindling old growth forest base has also created an uncertain future. The traditional multiple use approach to forest management has been challenged with recreation and environmental issues conflicting with timber harvest decisions. The County has had little control in the decisions to be made on future timber harvest levels on federal, state, and private lands, (Bureau of Reclamation, 1991).

The second basic industry, tourism, also relies on the natural resources of the County. Several destination recreation areas in the County, including Crater Lake National Park and the Oregon Sand Dunes National Recreation Area, three wilderness areas, the Umpqua national forest as well as the County's extensive park system, attract visitors. Interstate-5 passes through the County from north to south. Good roads leading to the ocean and the mountains provide recreation opportunities for sightseers, fishermen and hunters (Bureau of Reclamation, 1991).

Agriculture is another basic industry that plays an important role in the economy of Douglas County. Livestock grazing occurs on 11 percent of the County's land area. Orchards, grains, and row crops are grown on another 2 percent. Douglas County is the leading sheep producer in Oregon, as well as a leading cattle producer in western Oregon. Livestock, hay, and pasture remain the most important agricultural products, particularly in the Elk Creek subbasin. Lack of a reliable source of water for irrigation is limiting the expansion of this industry (Bureau of Reclamation, 1991).

Douglas County contains abundant mineral deposits and is the only domestic source of nickel, however low market prices have discouraged mineral extraction. The last mining operation in the Elk Creek subbasin was the Elkhead Mine which extracted cinnabar for the recovery of elemental mercury. The mine was closed in 1971.

Efforts are being made by Douglas County to change the industrial composition of its economic base. The first is the County's efforts to diversify the economic base. The County identified the construction of water storage projects as one element in the effort to attract new industry to the area. Construction of additional storage would improve the potential for economic growth, because existing industries are water limited. The construction of Galesville Dam in the southern portion of the County in 1985 demonstrates this fact. This effort has resulted in three major new manufacturing facilities recently locating in the Roseburg area. Although the wood products industry will continue to be Douglas County's most important industry, it will not be the source of many new jobs (Bureau of Reclamation, 1991).

The second effort is the broad restructuring of the economy away from goods-producing towards service-producing, reflecting the trend in the Nation. The impact is less noticeable in Douglas County because of the substantially greater role of the wood products industry. However, as the wood products industry itself restructures, the trend towards a service economy will be more noticeable.

3.1.21.1.3 Employment

The total civilian labor force in Douglas County totaled an average 45,000 people in 1990. Approximately 7.6 percent of the work force or 3,400 people were unemployed. Total non-agricultural wage and salary employment in Douglas County averaged 32,000 in 1989 according to data provided by the Employment Division of the Department of Human Resources of the State of Oregon. Approximately 8,900 of these jobs were in the timber and wood products industry with a 1989 payroll of over \$217 million. These jobs are included in the percentage of manufacturing jobs illustrated in Figure 3-21-2.

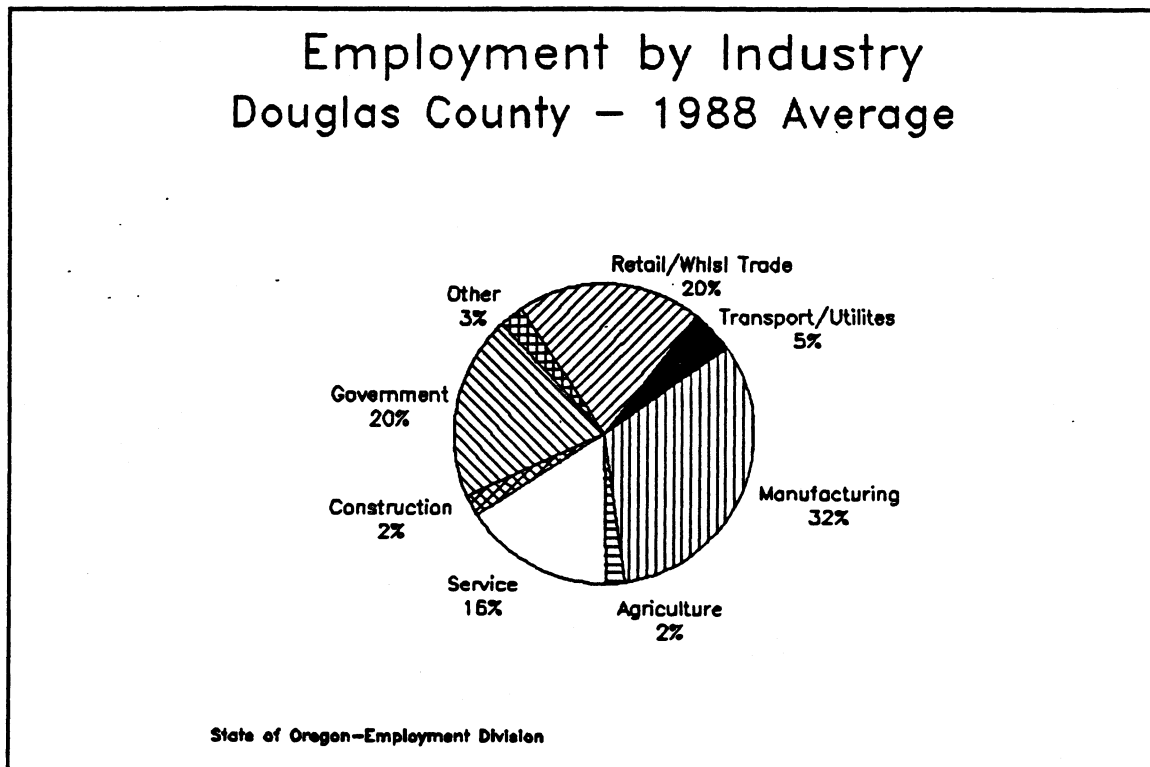


Figure 3-21-2. Employment by industry.

It is estimated that each wood products industry job creates at least one other job in the business community. Self employed and unpaid family workers comprise 11 to 13 percent of the total work force. Nonfarm proprietors increased at a rate of 24.7 percent in 1987 outpacing total employment growth of 11.3 percent. Federal, State, and local governments employ approximately 10,000 persons (Bureau of Reclamation, 1991).

Employment in the agricultural sector has eroded with an average 930 workers in 1988 compared to 1,210 seasonal and nonseasonal workers in 1980. The County's total labor force has a history of steady growth similar to the trend of the Nation. Cyclical and seasonal variations in the wood products industry are significant factors in unemployment.

3.1.21.1.4 Income

In 1989, approximately 65 percent of personal income in Douglas County is received in the form of wages and salary. Dividends, interest, and rent account for 16 percent, and transfer payments are about 19 percent. This is contrasted to 1970 when transfer payments totaled 12 percent and dividends, interest, and rent were 12 percent. The largest single source of transfer payments in Douglas County is payment for retirement and disability. Thirty-eight percent of earned income (wages and salaries) comes from manufacturing industries as shown in Figure 3-21-3. Manufacturing employs 32 percent of the work force (Bureau of Reclamation, 1991).

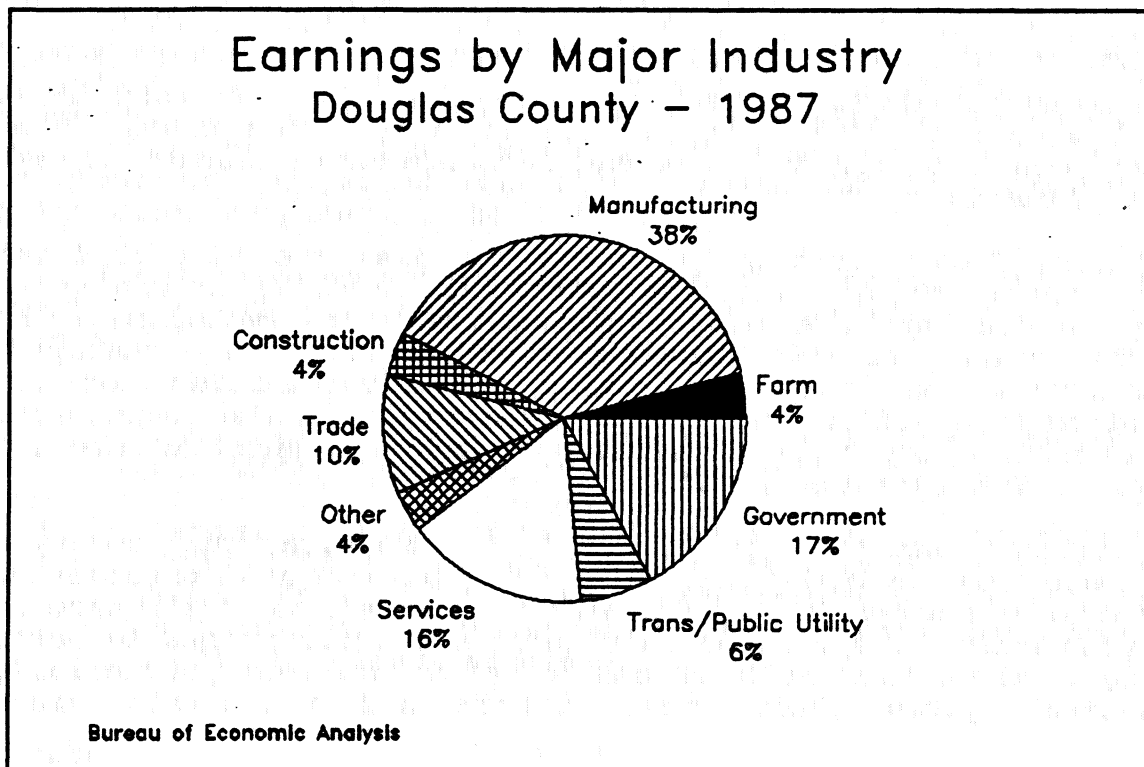


Figure 3-21-3. Earnings by major industry.

and Rice Hill also would benefit from increased availability of domestic water supplies since the pipeline would supply the Yoncalla and Rice Hill area. This would alleviate the problem of reliance on contaminated ground water at Rice Hill and the inadequate water supply at Yoncalla. Rural domestic water users would also experience a reliable water supply (Myers, 1992). The project's reliable water supply would enhance economic development and diversification within the project service area.

3.1.21.2.2.4 Commercial and Sports Anadromous Fisheries

The project would benefit the commercial and sports anadromous fisheries outside of the Elk Creek subbasin. Four anadromous fish species are involved: Winter steelhead, coho, fall chinook, and sea-run cutthroat. Benefits are based on the harvestable production and method of harvest (commercial or sport).

Table 3-21-9 shows an annual value for the ocean commercial harvest resulting from project enhancement efforts. Table 3-21-10 lists the benefit values for the sport fishery. Values derived represent annual benefits under full enhancement efforts.

Table 3-21-9. Annual Commercial Anadromous Fishery Value.

Species	Catch/ Escapement	Net Increase* in Escapement	Percent Commercial	Ocean Commercial Harvest	Average Dressed Weight (lbs)	Ex-Vessel Price	Benefit Value
Coho	3.5:1	1,350	66	3,119	6	\$1.43/lb	\$26,757
Fall Chinook	2.0:1	1,200	75	1,800	16	\$2.44/lb	\$70,272
Total				4,919			\$97,029

* Losses upstream of the dam are considered in the computation of the net increase in escapement.

Source: Myers, 1992.

Table 3-21-10. Annual Sport Anadromous Fishery Value.

Species	Sport Harvest	Percent Ocean	Percent Fresh Water	Angler Days Ocean/Fresh	Ocean Benefit Value \$60/day	Fresh Water Benefit Value \$51/day	Total Sport Value
Winter Steelhead	570	0	100	0/2.9	--	\$ 84,303	\$ 84,303
Coho	1,607	85	15	1.0/2.9	\$ 81,932	35,640	117,572
Fall Chinook	600	85	15	1.0/2.9	30,600	13,311	43,911
Sea-run Cutthroat	200	0	100	0/2.9	--	29,580	29,580
Total					\$ 112,532	\$ 162,834	\$ 275,366

Source: Myers, 1992

The life cycles from smolts to adults vary from one to three years depending upon species. Fisheries benefits, due to increased production and harvest resulting from project enhancement, could take several years to be fully realized. However, project enhancement benefits would be realized in a shorter time frame by planting smolts prior to completion of the project, thereby anticipating the return of harvestable stock the year the project is completed. Planting activity 3 years prior to project completion and 1 or 2 years after project completion could reduce the development lag by several years. This effort would also assure continued project enhancement and result in a major portion of the programmed annual benefits being realized in the first year of project operation. The majority of the harvest of one life cycle would occur during the second and third years after smolt release, depending on the species. The majority of fish populations for this project would consist primarily of winter steelhead and coho. The majority of the coho would have returned by the end of the second year of escapement. Most of the winter steelhead would return in the second year with a small portion returning in the third year following smolt release.

By implementing early planting of smolt, it is estimated that 60 percent of the annual benefits would be realized in year 1 of the project. The remaining 40 percent would be realized in years 3 and 4.

3.1.21.2.2.5 Reservoir Recreation Benefits

The physical constraints of the proposed reservoir site were evaluated to determine its suitability for development. Those physical constraints considered were reservoir access, shoreline slope and summer reservoir operation. Existing roads lead to the site and provide access to either side of the proposed reservoir. The shoreline slope would provide areas suitable for development with some fill work and grading. Recreation facilities are proposed for two sites and would include access roads, caretaker facilities, launch ramps, trolley docks, individual and group picnic sites, car/trailer parking, restrooms, and hiking trails. Facilities would be handicap accessible. Additional facilities such as camping, additional picnic tables and hiking trails could be added if future demand develops. Boat ramps at the sites would accommodate all but the lowest reservoir levels.

The perceived quality of the recreation experience and the number of days of recreation use quantify the value of the benefits. The estimate of boat ramp recreation days counts only those fishing days which involve use of the boat ramp. The fishing days estimated are for non-boat ramp use fishing. This avoids the possibility of double counting benefits for fishing days. The reservoir recreation benefits are summarized in Table 3-21-11, and

show an annual total benefit of about \$342,500.

It is anticipated that with average precipitation, the reservoir would reach capacity by the end of March of the first year. Thus, full use of the recreation facilities would be achieved in the first year after completion of the project.

Table 3-21-11. Annual Reservoir Recreation Benefits.

Facility Based Use

<u>Recreation Facilities</u>	<u>Number of Unit Days</u>	<u>Unit Day Value</u>	<u>Annual Benefit</u>
2 Boat Ramps ^{1/}	10,000	\$6.30	\$ 63,000
52 Picnic Units	20,000	\$6.50	\$130,000
Fishing Days	6,500	\$6.50	\$ 42,250
Subtotal	36,500		\$235,250
<u>Non-Facility Based Use</u> ²⁾	<u>16,500</u>	<u>\$6.50</u>	<u>\$ 107,250</u>
Total	53,000		\$ 342,500

- 1) Assumes east ramp would receive the majority of spring/early summer use, and west ramp would receive moderate spring/early summer and late summer use.
- 2) Sightseeing, hiking, wildlife observation, dispersed picnicking.

Source: Myers, 1992

3.1.21.2.2.6 Reduction of Flood Damage

Flood damage reduction benefits, provided by the Portland District office of the Army Corps of Engineers for the Cooperative Study, are the basis for the following material (Myers, 1992). The majority of flood damages occur within the city of Drain. In the absence of flood control measures, periodic flooding will continue. Damages were estimated for the 2, 10, 50, 100, and 500-year flood events. Damages were estimated for bridges, residential homes and contents, commercial buildings and contents, public buildings and contents, industrial buildings and contents, and agricultural lands. Douglas County provided information on agricultural lands, buildings, and replacement costs for bridges. Structural damage was based on information in the Willamette System Study. The annual flood reduction benefits for the Milltown Hill Dam project is estimated to be \$148,300.

3.1.21.2.2.7 Reduction of Treated Effluent Costs

The Department of Environmental Quality regulates discharge of wastes in Oregon. That agency has required both Drain and Yoncalla to provide facilities for storage of treated effluent during the

low-flow months of the year, when the quality and quantity of streamflows fall below levels that allow for adequate assimilation of treated effluent. Operation of the Milltown Hill Project would result in significantly augmented summer streamflows as releases are made from the reservoir to Elk and Yoncalla Creeks for downstream uses and to enhance aquatic habitat. The resultant improved instream quality and quantity conditions would provide an opportunity for alleviation of the storage requirements on the cities, thereby easing future needs for additional effluent storage capacity, increased treatment capabilities, or both. The economic benefit of this situation has not been evaluated.

3.1.21.2.3 Mitigation of Impacts to Socio-economic Conditions

No significant influx of construction workers is anticipated because of the high unemployment condition in the County, particularly among individuals with construction skills. Presently unemployed workers would be available for project jobs. Similarly, no retail business would be displaced. The County transportation system and other in-frastructure are capable of handling commuting construction workers with no noticeable shift in population among communities.

Mitigation of the people relocation impacts associated with the project would be done in accordance with the "Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs" (49 CFR Part 24). Notice of the Final Rule for these regulations was published in the Federal Register March 2, 1989. The purpose of this rule is to implement the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 et seq.) with the objective that those affected by Federal and federally-assisted projects are treated fairly and consistently. A fair market price would be paid for all parcels of land acquired. In some instances, where lands are not to be inundated or required for some structural or recreation purpose, it may be possible to negotiate management easements, without displacing the land owner.

3.1.22 Transportation

3.1.22.1 Existing Transportation Conditions

Douglas County's transportation network serves the public well. Interstate-5 traverses the county from north to south. This highway is the main western link between Canada and Mexico. U.S. Highways 38 and 42 are the main east-west arterials. County Road #7 (Elkhead Road) provides 4 miles of paved 2-lane road from Interstate-5 to the west side of the proposed reservoir. County

Road #8 (Scotts Valley Road) provides access to the east side of the proposed reservoir. County Roads #7 and 8 join at a point near the south end of the reservoir. State Highway 38 provides access from I-5 to Drain and Elkton. U.S. Highway 99W provides access from I-5 at Rice Hill to Yoncalla and Drain.

The present traffic volume on Elkhead Road on the east side of the I-5 Freeway interchange is approximately 880 vehicles per day. The traffic volume on Elkhead Road on the west side of the freeway is approximately 610 vehicles per day (pers. comm., Warren Poland, Douglas County).

3.1.22.2 Impacts to Transportation

3.1.22.2.1 Construction Impacts

Most construction workers are expected to be local residents, commuting from Roseburg, 30 miles south of the project area. Most imported workers are expected to reside in Roseburg, Oakland, Yoncalla or Drain. Most construction activities would involve the clearing of the 681-acre reservoir and construction of the dam, so the majority of construction traffic would be on 4 miles of County road #7. Increased maintenance of this road would be required.

County Roads #7 and #8 would be partially relocated and/or upgraded (Figure 2-2). County Road #7, between the north end and south end of the reservoir (about 3 miles), would be relocated and upgraded less than 1/8 mile west of the existing road near 885 feet msl. County Road #8 would be relocated less than 1/8 mile from its present alignment and causeways added across Lane Creek and Elk Creek (Figure 2-2).

During construction, traffic would be allowed to use the existing roads with some minor delays, especially when the pipeline system is constructed at road crossings. The replaced segments of County Roads #7 and 8 would be abandoned after the new relocations were finished. Most of the construction traffic would occur in the reservoir pool area and at the Otten Quarry so no significant impact to public transportation is anticipated during construction.

3.1.22.2.2 Operation Impacts

The projected recreational use at the Milltown Hill Dam is estimated to be 53,000 annual visitor days (See: Section 3.1.17 Recreation). This number of visitors could be expected to produce approximately 15,000 vehicle trips to the reservoir site during an average annual 200 day recreation period. Based on weekly distribution figures from other county park facilities, it is expected that weekend traffic volumes will range from 2 to 4 times

weekday volumes (pers. comm., Warren Poland, Douglas County). Using an average value of 3, the increase in peak weekend traffic volume in the reservoir area would be approximately 287 vehicles per day and the increase in weekday traffic volumes would be approximately 95 vehicles per day.

Access to the reservoir site may be made from north or south on both Elkhead Road and Scotts Valley Road. It is expected the majority of visitors would come from the north by way of Elkhead Road or Scotts Valley Road from the nearby interchange in the I-5 Freeway. Based on a distribution estimate of 75% from the north, the increased traffic at the Freeway interchange would be approximately 71 vehicles per day on weekdays and 215 vehicles per day on the weekends.

The split of recreation traffic at the interchange is expected to be approximately a 50-50% ratio north to south and to be rather uniformly distributed throughout the day. The addition of these recreational traffic volumes, therefore, whether during the weekday or on the weekends is expected to make very little difference in the intersection level of service.

3.1.22.3 Mitigation of Transportation Impacts

The County would perform road maintenance as required during the construction period to reduce delays in travel and for safety purposes. During operation of the project the County would increase maintenance on County Roads #7 and #8 during the spring and summer months when increased recreational use would occur. The increased safety factor due to the relocation of the roads would more than offset any delays or other adverse impacts during construction.

3.1.23 Police Protection

3.1.23.1 Existing Police Protection

Police protection is provided by the County Sheriff's Department. The Department's substation nearest to the area is located in Drain, approximately 8 miles away. In addition, the Oregon State Police has approximately 3 officers in Sutherlin (about 20 miles south) to assist the Sheriff's Department in law enforcement operations, including enforcement of traffic and game laws.

3.1.23.2 Impacts to Police Protection

The recreation sites at the reservoir would probably require a part-time Sheriff's deputy during the recreation season. Estimated annual cost is \$20,000, which includes salary and vehicle use.

3.1.23.3 Mitigation of Police Protection Impacts

The County would absorb all costs of the extra police protection.

3.1.24 Fire Protection

3.1.24.1 Existing Fire Protection

Brush and timber fires are handled by the Douglas County Forest Protective Association, which has its headquarters in Roseburg. Structural fires would be responded to by the Yoncalla Volunteer Fire Department.

3.1.24.2 Impacts to Fire Protection

No significant fire protection impacts are expected as a result of construction and operation of the proposed project. However, the risk of forest fires would increase due to anticipated increased recreational use of lands in the vicinity of the reservoir.

3.1.24.3 Mitigation of Fire Protection Impacts

The reservoir would supply a new and readily available source of water for the suppression of wildfires. In addition, fire hydrants would be located on the pipeline in the service areas.

3.1.25 Schools

3.1.25.1 Existing School Conditions

It is anticipated that most of the construction workers (up to 126) would be housed in the city of Roseburg (population 16,600) approximately 30 miles south of the project area and in the smaller and closer communities of Oakland (population 800), Sutherlin (population 5,042) Yoncalla (population 1,220), and Drain (population 1,740). All have schools grades K through 12.

3.1.25.2 Impacts to School Conditions

During the construction period, the work force would peak at 126 during the third year of construction. It is estimated that approximately one-half of the work force would be married having an average of 2 children per family. Since most (approximately 80 percent) of the expected work force presently reside in the local area, their children's needs for school are already satisfied. The remaining 20 percent of one half of the work force of 126 persons who are married with children and move into the area would require schooling. This would indicate that approximately 25 additional children would require schooling.

It is anticipated that the schooling needs of 25 children would be easily absorbed by the local school districts, and therefore no significant adverse impact would be created. Operation of the project would not impact schools.

3.1.25.3 Mitigation of Impact to Schools

None is planned because no significant impacts are expected.

3.1.26 Health Facilities

3.1.26.1 Existing Health Facilities

The nearest health facility to the proposed dam site is the Drain clinic, approximately 20 minutes travel time by car. Travel time to either of the two hospitals in Roseburg is approximately 45 minutes. These hospitals have a 234 total bed capacity.

3.1.26.2 Impacts to Health Facilities

No significant adverse impacts to existing local health facilities are anticipated from construction or operation activities of the proposed project.

3.1.26.3 Mitigation of Impacts to Health Facilities

None is planned because no significant adverse impacts are expected.

3.1.27 Energy

3.1.27.1 Existing Energy Conditions

There are no electrical or other types of energy production facilities in the Elk Creek subbasin. Other than energy in the form of fossil fuels consumed by homes, automobiles and farm equipment, there are no other consumptive uses.

A high voltage electric transmission corridor transects the proposed reservoir area. A natural gas pipeline parallels Interstate 5 through the subbasin.

3.1.27.2 Impacts to Energy

No existing local source of energy production or consumption would be affected by the proposed project, however large amounts of energy in the form of fossil fuels would be consumed during construction of the project. Large quantities of fuels would be needed for operation of the heavy construction equipment for quarrying, transportation of materials and spoils, road construction, relocation and maintenance, and dam construction. Minor amounts of electrical energy would be needed during the construction phase. Project operation would require minor amounts of fossil fuels and electrical energy. Recreational users of the reservoir would consume additional fossil fuels in the vehicles and boats. No significant impact or energy consumption is expected during construction or operation of the proposed project.

3.1.27.3 Mitigation of Energy Impacts

No mitigation measures are planned.

3.1.28 Indirect Impacts

Direct and indirect impacts have been discussed in previous sections. No distinction was made between the types of impacts. Direct impacts can be identified and quantified easier than indirect impacts that may occur gradually over a longer period of time. Indirect impacts, such as could occur during residential, commercial, and industrial growth, are expected to have only minor impacts on natural resources.

An overview of the existing conditions in the Elk Creek subbasin may help put into perspective the indirect impacts of the project. Elk Creek subbasin occupies 209 square miles. There are three cities in the subbasin. The population sizes are: Yoncalla, 1,220; Drain 1,740; and Elkton 235. It is estimated that an

additional 3,000 people reside in rural areas of the subbasin, including the community of Rice Hill. This would indicate population density of only 30 persons per square mile.

Only the residents of Yoncalla, Drain, and Rice Hill, and the rural residents of Scotts Valley, Yoncalla Valley, and those on farm lands adjacent to the lower Elk Creek would benefit from water distributed during project operation. There would not be project-related impacts to the people, land or land resources in approximately 78 percent of the subbasin. Most of the Elk Creek subbasin is forested and is unoccupied because of State and County land use restrictions, and the occupancy restrictions on the public lands in the subbasin. Population growth in the project-affected areas would happen at a slow rate. The project water releases have already been identified and quantified (937 acre-feet for municipal-industrial use, 9,654 acre feet for irrigation, and 7,737 acre-feet for anadromous fisheries and water temperature control). In addition, to other prior water rights, the State of Oregon also has instream flow rights on Elk Creek. These water release restrictions would place limits on municipal expansion and industrial growth and the resultant public service load in the cities. Although the water supply for municipal and industrial services would increase, the increase (973 acre-feet) is too small to cause significant indirect impacts. Consequently, only minor changes are expected in industrial and commercial diversification, such as those that would stabilize the existing operations, as well as result in a slight increase in activity. The primary goal is to provide a stable water supply.

Expansion of population is expected to be small in these rural areas and the rate of growth is not expected to significantly change. The limited water supply, even with the project, would effectively limit growth. Populations would increase slowly over the years, because there is no indication that an industry with many employees would likely locate in the area. It is more likely the water supply for existing business would stabilize the business, with some expansion, and that only small businesses, with few employees, would locate in either Yoncalla, Drain, or the Rice Hill area due to land-use restrictions.

The County Comprehensive Land Use plan approved by the Oregon Department of Land Conservation and Development identifies urban growth boundaries for the City of Elkton, City of Drain, and the City of Yoncalla. The community of Rice Hill is a Rural Service Center and has a defined boundary. For development to occur outside the boundaries, land use changes would have to occur through a formal process that considers necessity of the change, the impact of the changes on the livability of the area, and natural resources affected. Growth outside these areas is controlled by resource zoning and parcel size. In a timber resource zone, no homes are allowed; in a farm forest zone, the minimum parcel size for homes is 200 acres; and in exclusive farm

4.0 CONSULTATION AND COORDINATION

4.1 Introduction

The Bureau of Reclamation and Douglas County have attempted to involve all concerned Federal, State, and local agencies as well as the public throughout the data gathering and analysis processes. Early in the planning process, several issues of concern were raised, and as the process developed, other issues became known. This process has been followed, concerns were addressed as they arose, and all appropriate data were considered in formulating the County's preferred alternative (Table 4-1). In addition, environmental commitments were developed (See: Appendix B). The following discussions summarize the record of consultation, coordination, and public involvement and how the activities were used in the decisions and planning of the project.

Agencies involved in the environmental process include the Fish and Wildlife Service, National Marine Fisheries Service, Bureau of Land Management, and Oregon Department of Fish and Wildlife. The Fish and Wildlife Service prepared a Coordination Act Report and reviewed the Bureau of Reclamation's Status Report and Environmental Analysis. Fish and Wildlife Service comments on the latter and Bureau report of Reclamation responses are in Appendix C.

Contacts made for recreation planning included the Oregon Department of Transportation (Parks and Recreation Division) and the Douglas County Parks Department. Contacts regarding historic and cultural resources included the State Historic Preservation Office and the Douglas County Museum. The U.S. Army Corps of Engineers participated in flood studies by reviewing study work and preparing the economic analysis. The Bureau of Land Management was consulted on right-of-way issues on land it manages and is a cooperating agency in preparing this EIS. Consultation with the Bureau of Mines was initiated to obtain an evaluation of the potential for commercial recovery of minerals in and near the project area. The Soil Conservation Service conducted soil classification surveys on the service areas and on the project "take" lands, including the reservoir area. The Geological Survey was consulted regarding ground water availability and quality and ground water movement in the subbasin. The Oregon Department of Environmental Quality was notified of the proposed project and provided information. The state of Oregon A-95 Clearing House Process also was utilized (See: Appendix D).

This Section is a chronological summary of consultation and coordination on the following issues:

- Public Involvement
- Water Quality

In addition, Douglas County is developing a Coordinated Resources Management Plan for the Deer Creek subbasin. This project would address flood control and irrigation needs. A 12,000-acre-foot impoundment is anticipated. The County is also actively studying the need for a 12,000 acre-foot impoundment on Gassy Creek to meet needs for future municipal and industrial requirements in the cities of Sutherlin and Oakland, and irrigation requirements along Calapooya Creek. Douglas County believes that such projects including the Milltown Hill project will, cumulatively, increase opportunities for economic diversification by encouraging those industries that have expressed interest in the area, but have been deterred from investing capital, due to the lack of an assured water supply.

3.1.30 Residual and Unavoidable Adverse Impacts

There are residual and unavoidable adverse impacts that would occur during the 3-year construction period and during the operation period.

3.1.30.1 Air Quality, Noise, and Visual Quality

The 3-year construction phase of the project would produce minor, short-term adverse impacts on local air quality. Exhaust emissions from construction vehicles and fugitive dust would decrease air quality in the reservoir area. Noise levels at the dam and quarry site would temporarily increase due to onsite machinery and to vehicles transporting materials. Increased noise levels would also be associated with clearing and grading operations for the relocation and construction of roads where necessary and would extend outside the immediate reservoir vicinity along County Roads #7 and #8 affecting local residents.

Impacts on visual quality include exposed soils and topographic change (especially at the Otten Quarry, located above the high water level), some sedimentation of Elk Creek, presence of large construction machinery and stockpiled materials, piled debris and excavation materials, and rechannelization of Elk Creek through a conduit. Construction and operation would also result in increased human activity in this low-use area this could be objectionable to local residents.

3.1.30.2 Vegetation

Construction of the dam would result in the inundation of 681 acres at the reservoir site. This includes some 260 acres of land in agricultural use (including the home sites), 160 acres of commercial forest land and 173 acres of sparse riparian growth. Additional clearing would be required for the penstock, recreational facilities and access roads to the reservoir and dam,

including County Roads #7 and #8. Loss of the agricultural and timber land and riparian land cannot be mitigated. Loss of agricultural production, however would be offset by increased productivity of lands irrigated by the project.

3.1.30.3 Fish and Wildlife

Wildlife would lose the 681-acres of habitat to be occupied by the reservoir. Less-mobile animals such as small mammals, reptiles, and amphibians would be killed directly during construction and filling of the reservoir. Nesting birds would be directly affected since their habitat would be eliminated. Wildlife displaced from the project area by construction activities and subsequent inundation would compete for food and space on adjacent lands, the net result would be a reduction in wildlife populations roughly equal to the number of animals occupying the inundated acres. This would be partially mitigated by managing the clearing in the upper reservoir to help minimize loss of wildlife habitat.

Development of the reservoir would cause the loss of over 4.5 miles of free-flowing stream environment in upper Elk Creek. This loss would affect the benthic macroinvertebrate and fish communities utilizing the section of Elk Creek inundated by the reservoir pool. The dam would prevent anadromous fish from using this segment of Elk Creek.

3.1.30.4 Social Conditions

Ten households including 26 people would be relocated as a result of the proposed project. This constitutes the greatest unavoidable adverse social impact of the project. This group's quality of life and social well-being would be affected. They are presently affected by the prospect of losing their homes, being extracted from a community they may have been instrumental in building, and dealing with unknown problems of resettlement, possible re-employment, and social re-establishment. Their concerns can be only partially alleviated by monetary compensation.

3.1.30.5 Water Quality

Short-term construction-related impacts on surface water include unavoidable increased turbidity and suspended sediments. These impacts are expected to be temporary and minor, since settling ponds, berming, and filtering would be used to control most sedimentation and turbidity. The potential also exists for petroleum product spills during construction, which could reduce water quality and be toxic to aquatic organisms for short periods of time. To minimize the potential for these occurrences, the contractor would prepare spill control plans.

During its initial years of operation, the reservoir, like any new reservoir, will have reduced water quality due to decomposing organic materials, nutrient leaching from the soil, and erosion. These factors could cause suspended sediment increases, turbidity increases, algal blooms, and dissolved oxygen reductions in the reservoir. These effects would continue downstream for an unknown distance.

The water level in the reservoir would cause a corresponding rise in the existing ground water level in the immediate pool vicinity. This rise in the ground water level could have the potential to adversely affect the stability of the slopes adjacent to the reservoir and could result in minor soil sloughing.

3.1.31 Relationship Between Short-term Uses of the Environment and Long-term Productivity

The short-term uses of the project area are increased construction employment and local economic stimulation. The long-term productivity of the project include:

- Improved anadromous fish production in Elk Creek
- A reliable year-long source of water for municipal, industrial, fish and wildlife, agriculture and recreation
- Improved flood control along Elk Creek
- New warm water and cold water fishery in the reservoir
- Increased agricultural production
- New habitat for waterfowl
- Improved water quality
- A new long-term source of flat water recreation activities
- Increased productivity of wetlands
- Increased opportunities for economic diversity
- Increased secured habitat for the Columbian white-tailed deer.

Providing water for the above uses represents a long-term commitment of a natural resource.

The long-term productivity of agricultural lands would be enhanced by the project through irrigation. Productivity increases on irrigated lands would more than offset productivity lost due to

inundation of agricultural lands in the reservoir area.

The fishery enhancement program represents a long-term commitment of water for augmented streamflows. Fish production in Elk Creek would be enhanced throughout the life of the project. Long-term wildlife production would diminish in the project vicinity (except for waterfowl and raptors) by removal of habitat which would be occupied by the reservoir and appurtenant project facilities.

The productivity of industries that currently run the risk of curtailed operations due to water shortages would be increased over the long term. Similarly, a reliable source of water would allow new industries to be established. The recreation features of the project would result in a long-term increase in recreation opportunities in the area.

Project area residents who live downstream from the dam would likely perceive a reduction in their quality of life due to increased human use of the reservoir, because of the high value they place on the natural beauty of the area, the slow-paced, quiet rural life, and the close personal connections among residents. These values would be further compromised during dam construction by relocation of friends and neighbors, increased traffic, increased noise and dust, and the presence of strangers.

The community of Drain and property owners below the dam would benefit by a slight reduction in the effects of floods on Elk Creek. This would represent a long-term benefit. Reduction in flood levels during high flow months and increased flow in summer would improve water quality during these periods. These represent long-term benefits.

Some residents in the project area could feel a long-term sense of decreased quality of life resulting from increased traffic, noise, presence of recreationists, and the changed appearance of the area. Although these social effects cannot be completely offset, they would be counter-balanced by the quality-of-life improvements in the water service areas. These would include reliable water supply, potential for economic growth, enhanced crop production, reduction of flood losses, and sport fish enhancement. The project would allow continued population growth, unconstrained by limitations of water availability.

3.1.32 Irreversible and Irretrievable Commitment of Resources

Financial resource commitments to a project of this magnitude include primarily the capital loan, interest, labor, materials, and energy used in project construction, operation, and ultimate abandonment. Additional capital, labor, materials, and energy resources would be irretrievably committed in maintaining the

proposed facilities.

The provision of flows for fish habitat maintenance and enhancement would require a firm guaranteed water allotment for that purpose. Commitments to other project functions must remain in an irreversible and irretrievable status to provide a viable project. Any change in any of these commitments for the use of water would severely affect the achievement of these functions.

Soil losses during construction and operation would be irreversible.

The loss of agricultural and timber lands located in the reservoir area would be an irreversible commitment.

Permanent alterations of the landscape would be irreversible commitments of visual and scenic values.

The loss of habitats and individual plants and animals during construction of the reservoir, control building, and access roads would be irreversible and irretrievable.

Any undiscovered archaeological resources inadvertently destroyed or flooded would be irretrievably lost.

3.2 Environmental Consequences of the No Action Alternative

The proposed project area would remain in its present condition if no action was taken. The identified needs of the county and of the residents of the service area would not be realized. In addition, enhancement opportunities for natural resources would not be realized.

The environmental components which would remain unchanged if the project was not constructed are geology, topography, seismicity, soils, mineral and aggregate resources, climate, air quality, vegetation, wetlands, timber, threatened and endangered species, wildlife, noise, cultural resources, recreation, and visual resources.

A summary comparison of the impacts of a no-action alternative and the preferred alternative is shown in Table S-2. The following discussions focus on the impacts on those environmental components which would be affected if the project was not constructed.

3.2.1 Land Use

The land area proposed to be occupied by the dam and reservoir would continue to be used as it is now. No new irrigation development is possible without surface water storage. Lands presently without sufficient sources of water will continue to

suffer from that problem, and the economic potential of the land would not be realized. The agricultural areas in Scotts Valley, Yoncalla Valley, and areas bordering lower Elk Creek would probably continue to be used primarily for livestock production. Such production would continue at present low levels due to the lack of water needed for irrigation. The areas occupied by the towns of Yoncalla, Drain and Elkton would remain the primary urban communities, showing little or no expansion. A small increase in rural homesites would occur.

3.2.2 Public Water Supply

Yoncalla would continue to rely on the diversion of water from Adams Creek. This source is not reliable. Water quality is unsatisfactory, since it is stored in a shallow 100 acre-foot reservoir. There would be no water for the expansion of existing industries or introduction of new industries in Drain, Yoncalla, or the Rice Hill area.

3.2.3 Surface Water Quantity

Summer flows in the lower segments of Elk Creek would continue to decrease as demands for irrigation water increase. Flow decreases would result in water temperature increases and dissolved oxygen decreases. Floods would continue to be an unresolved problem in lower Elk Creek.

3.2.4 Surface Water Quality

Water quality would remain much as it is now. Some minor improvement in suspended sediment and color could result if restrictions on harvesting old growth timber are enforced. Increased demands for surface water would increase with a resultant decrease in water quality due to increased domestic waste discharge expected with slight increases in population.

3.2.5 Ground Water

Slight increases in rural home construction in the project area can be expected in the future. This would further increase the demand for domestic water, resulting in further depletion of ground water in the vicinity of Drain, Yoncalla, and Rice Hill as well as in areas downstream from Drain.

3.2.6 Anadromous Fish Habitat

The fisheries resource would remain much as it is today, since few actions to improve habitat are likely. Low summer flows and

poor instream habitat would continue to limit resident and anadromous fish populations. Decreases in water quality would likely adversely affect fisheries resources.

The upper 4 1/2 mile segment of Elk Creek which would be occupied by the proposed reservoir would remain as habitat for anadromous and resident fish. The lower reaches of Elk Creek and its tributaries would continue to be marginal spawning habitat for anadromous fish, due to low flows and high water temperature during the irrigation season.

3.2.7 Population

The displacement of about 26 persons from their homes in the reservoir area would not be necessary. Without new industries, the population of Drain and Yoncalla would grow slightly, but not as rapidly as Douglas County or the State of Oregon. A slight increase in rural population can be expected in Elk Creek subbasin, since people who prefer the rural quality of life will build homes, and commute to Eugene or Roseburg for their livelihood. A small increase in population may occur from in-migration of retirement-age people. This would probably be offset by the out-migration of younger people looking for livelihood in Roseburg or Eugene, or other metropolitan areas.

3.2.8 Economic Growth

Opportunities for economic growth and diversity in the communities of Drain, Yoncalla, Rice Hill and Elkton would not be realized, due to the lack of water for irrigation and industrial use. These communities would continue to have their economy based on jobs relating to the wood processing industry, which could face further decreases in production in the near and not-so-near future.

Douglas County has placed the Elk Creek subbasin as its first priority among several small water development projects in the County. The County has also indicated that if the preferred alternative cannot be identified as a feasible project then it will place the Milltown Hill storage plan in an inactive status and pursue studies in other tributaries to the Umpqua River. The County would reconsider Elk Creek in the future and determine if conditions had changed sufficiently to warrant a renewed attempt to develop the project. Termination of the study would preclude any significant growth or economic stabilization within the Elk Creek subbasin.

The Federal government is in the process of developing a recovery plan for the threatened Northern spotted owl. The plan could call for a significant decrease in timber harvests on federal lands. Large, old-growth forest areas characteristic of Douglas County will be particularly affected. The anticipated reduction in

timber harvest could result in a decline in forest products production, and Douglas County could likely experience an outmigration of people and high unemployment. Such a situation would reduce County income, increase costs for assistance programs, increase social problems, and intensify the need for economic diversity and stabilization.

A drop in County revenues would make developing an infrastructure to attract new business more difficult. Since 1980, Douglas County has invested over \$19 million of Oregon and California (O&C) timberland revenues in water resource projects. The future availability of O&C revenues for water resource development may be in jeopardy, as these funds may be diverted to provide for other social needs resulting from anticipated high unemployment. If the project is not developed, the existing social problems would not only continue but may worsen as a result of the mandated reductions in timber harvests.

The community of Rice Hill can absorb only a limited amount of additional growth. Growth in the Rice Hill area would occur only if private wells are developed. Ground water in the Rice Hill area is difficult to find in quantities sufficient for domestic needs. Water quality has been a problem.

The City of Yoncalla is currently limiting expansion of its water system. While the city could possibly enlarge its current 100-acre-foot off-stream reservoir and increase the capacity of its Adams Creek pumping plant and pipeline, Adams Creek flows are too uncertain to significantly help the community.

The City of Drain has a water right to store 1,000 acre-feet of water at its Bear Creek reservoir, but site engineering conditions make enlarging the current reservoir unlikely. This situation would limit future growth in Drain.

Some rural domestic growth may occur elsewhere in the subbasin by using local ground-water supplies. However, land use restrictions on subdividing property would limit this type of growth.

3.2.9 Flooding

Periodic flooding would continue in the future. The subbasin would continue to suffer an average of \$205,000 in flood damages annually.